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<110> Borns, Michael

<120> DNA Polymerase Fusions and Uses Thereof

<130> 25436/2382

<140> US 10/805,650

<141> 2004-03-19

<150> US 60/457,426

<151> 2003-03-25

<160> 148

<170> PatentIn version 3.1

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<213> Artificial sequence

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<223> primer

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<220>
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<220>
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 <222> (16)..(18)
 <223> NNK where N=any nucleotide

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 <220>
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 <223> primer
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 <221> misc_feature
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 <222> (1)..(1)
 <223> 5'-phosphate

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 <223> 5'-phosphate

<400> 26
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<210> 27
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 <213> Pyrococcus furiosus

<220>
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 <222> (277)..(279)
 <223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

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 cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga 180
 aagattgtga gaattgttga tgtagagaag gttgagaaaa agtttctcgg caagcctatt 240
 accgtgtgga aactttattht ggaacatccc caagatnnnc ccactattag agaaaaagtt 300
 agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac 360
 ctcatcgaca aaggcctaht accaatggag ggggaagaag agctaaagat tcttgcccttc 420
 gatatagaaa ccctctatca cgaaggagaa gagtttggaa aaggcccaat tataatgatt 480
 agttatgcag atgaaaatga agcaaaggtg attacttggaa aaaacataga tcttcatac 540

gttgaggttg tatcaagcga gagagagatg ataaagagat ttctcaggat tatcagggag	600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg	660
aaaagggcag aaaaacttgg gattaaatta accattggaa gagatggaag cgagcccaag	720
atgcagagaa taggcgatat gacggctgta gaagtcaagg gaagaataca tttcgacttg	780
tatcatgtaa taacaaggac aataaatctc ccaacatata cactagaggc tgtatatgaa	840
gcaatTTTTg gaaagccaaa ggagaaggta tacgccgacg agatagcaaa agcctgggaa	900
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gcctacgaaa gaaacgaagt agctccaaac aagccaagtg aagaggagta tcaaagaagg	1140
ctcagggaga gctacacagg tggattcggt aaagagccag aaaaggggtt gtgggaaaac	1200
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aagttctgca aggacatccc tggttttata ccaagtctct tgggacattt gttagaggaa	1380
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gactatagac aaaaagcgat aaaactctta gcaaattctt tctacggata ttatggctat	1500
gcaaaagcaa gatgggtactg taaggagtgt gctgagagcg ttactgcctg gggaagaaag	1560
tacatcgagt tagtatggaa ggagctcgaa gaaaagtttg gatttaaagt cctctacatt	1620
gacactgatg gtctctatgc aactatccca ggaggagaaa gtgaggaaat aaagaaaaag	1680
gctctagaat ttgtaaaata cataaattca aagctccctg gactgctaga gcttgaatat	1740
gaagggtttt ataagagggg attcttcggt acgaagaaga ggtatgcagt aatagatgaa	1800
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ggatacatag tacttagagg cgatggcca attagcaata gggcaattct agctgaggaa	2160
tacgatccca aaaagcacia gtatgacgca gaatattaca tggagaacca ggttcttcca	2220
gcggtactta ggatattgga gggatttgga tacagaaagg aagacctcag ataccaaag	2280

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<210> 28

<211> 2328

<212> DNA

<213> *Pyrococcus furiosus*

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<222> (277)..(279)

<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga	180
aagattgtga gaattgttga tgtagagaag gttgagaaaa agtttctcgg caagcctatt	240
accgtgtgga aactttatatt ggaacatccc caagatnnnc ccactattag agaaaaagtt	300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac	360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgccttc	420
gatatagaaa ccctctatca cgaaggagaa gagtttgga aaggcccaat tataatgatt	480
agttatgcag atgaaaatga agcaaaggtg attacttgga aaaacataga tcttccatac	540
gttgagggtt tatcaagcga gagagagatg ataaagagat ttctcaggat tatcaggggag	600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg	660
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tatcatgtaa taacaaggac aataaatctc ccaacatata cactagaggc tgtatatgaa	840
gcaatttttg gaaagccaaa ggagaaggta tacgccgacg agatagcaaa agcctgggaa	900
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ttatgggatg tttcaaggtc aagcacaggg aaccttgtag agtggttctt acttaggaaa	1080
gcctacgaaa gaaacgaagt agctccaaac aagccaagtg aagaggagta tcaaagaagg	1140
ctcagggaga gctacacagg tggattcggt aaagagccag aaaagggggt gtgggaaaac	1200
atagtatacc tagatttttag agccctatat ccctcgatta taattacca caatgtttct	1260
cccgatactc taaatcttga gggatgcaag aactatgata tcgctcctca agtaggccac	1320

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<210> 29
<211> 2328
<212> DNA
<213> Pyrococcus furiosus

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<220>
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<222> (1161)..(1161)
<223> N = C, G, A, or T

<220>
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<222> (277)..(279)
<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN
INE)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga 180

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agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac	360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgccttc	420
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gacactgatg gtctctatgc aactatccca ggaggagaaa gtgaggaaat aaagaaaaag	1680
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gcggtactta ggatattgga gggatttga tacagaaagg aagacctcag ataccaaaag 2280
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<210> 30
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<212> DNA
<213> Pyrococcus furiosus

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<220>
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<222> (1161)..(1161)
<223> N= A,T,C or G

<220>
<221> misc_feature
<222> (277)..(279)
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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga 180
aagattgtga gaattgttga tgtagagaag gttgagaaaa agtttctcgg caagcctatt 240
accgtgtgga aactttatatt ggaacatccc caagatnnnc ccactattag agaaaaagtt 300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac 360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgcttc 420
gatatagaaa ccctctatca cgaaggagaa gagtttgga aaggccaat tataatgatt 480
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gttgaggttg tatcaagcga gagagagatg ataaagagat ttctcaggat tatcaggag 600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg 660
aaaagggcag aaaaacttgg gattaaatta accattggaa gagatggaag cgagcccaag 720
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gcggtactta ggatattgga gggatttgga tacagaaagg aagacctcag ataccaaaag	2280
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<210> 31

<211> 2328

<212> DNA

<213> *Pyrococcus furiosus*

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<220>
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<222> (423)..(423)
<223> N = C, G, A, or T

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<222> (429)..(429)
<223> N = C, G, A, or T

<220>
<221> misc_feature
<222> (277)..(279)
<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN
      INE)

<400> 31
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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga      180
aagattgtga gaattgttga tgtagagaag gttgagaaaa agtttctcgg caagcctatt      240
accgtgtgga aactttattht ggaacatccc caagatnnnc ccactattag agaaaaagtt      300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac      360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgcccttc      420
gcnatagcna ccctctatca cgaaggagaa gagtttgga aaggcccaat tataatgatt      480
agttatgcag atgaaaatga agcaaagggtg attacttgga aaaacataga tcttccatac      540
gttgagggttg tatcaagcga gagagagatg ataaagagat ttctcaggat tatcaggggag      600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg      660
aaaagggcag aaaaacttgg gattaaatta accattggaa gagatggaag cgagcccaag      720
atgcagagaa taggcgatat gacggctgta gaagtcaagg gaagaatata tttcgacttg      780
tatcatgtaa taacaaggac aataaatctc ccaacatata cactagaggc tgtatatgaa      840
gcaatthttg gaaagccaaa ggagaaggta tacgccgacg agatagcaaa agcctgggaa      900
agtggagaga accttgagag agttgccaaa tactcgatgg aagatgcaaa ggcaacttat      960
gaactcggga aagaattcct tccaatggaa attcagcttt caagattagt tggacaacct     1020
ttatgggatg tttcaaggtc aagcacaggg aaccttgtag agtggttctt acttaggaaa     1080
gcctacgaaa gaaacgaagt agctccaaac aagccaagtg aagaggagta tcaaagaagg     1140
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atagtatacc tagatttttag agccctatat ccctcgatta taattaccca caatgtttct	1260
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gactatagac aaaaagcgat aaaactctta gcaaattctt tctacggata ttatggctat	1500
gcaaaagcaa gatggtactg taaggagtgt gctgagagcg ttactgcctg gggaagaaag	1560
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gaaggggtttt ataagagggg attcttcggt acgaagaaga ggtatgcagt aatagatgaa	1800
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ggatacatag tacttagagg cgatggtcca attagcaata gggcaattct agctgaggaa	2160
tacgatccca aaaagcacia gtatgacgca gaatattaca tggagaacca ggttcttcca	2220
gcggtactta ggatattgga gggatttgga tacagaaagg aagacctcag atacccaaag	2280
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<210> 32
 <211> 2328
 <212> DNA
 <213> *Pyrococcus furiosus*

<220>
 <221> misc_feature
 <222> (423)..(423)
 <223> N = C, G, A, or T

<220>
 <221> misc_feature
 <222> (429)..(429)
 <223> N = C, G, A, or T

<220>
 <221> misc_feature
 <222> (277)..(279)

<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

<400> 32

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga	180
aagattgtga gaattgttga tgtagagaag gttgagaaaa agtttctcgg caagcctatt	240
accgtgtgga aactttattt ggaacatccc caagatnnnc ccactatttag agaaaaagt	300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac	360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgccttc	420
gcnatagcna cctcttatca cgaaggagaa gagtttgga aaggccaat tataatgatt	480
agttatgcag atgaaaatga agcaaagggtg attacttgga aaaacataga tcttccatac	540
gttgagggtg tatcaagcga gagagagatg ataaagagat ttctcaggat tatcagggag	600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg	660
aaaagggcag aaaaacttgg gattaaatta accattggaa gagatggaag cgagcccaag	720
atgcagagaa taggcgatat gacggctgta gaagtcaagg gaagaataca tttcgacttg	780
tatcatgtaa taacaaggac aataaatctc ccaacatata cactagaggc tgtatatgaa	840
gcaatttttg gaaagccaaa ggagaaggta tacgccgacg agatagcaaa agcctgggaa	900
agtggagaga accttgagag agttgccaaa tactcgatgg aagatgcaaa ggcaacttat	960
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ttatgggatg tttcaagggtc aagcacaggg aaccttgtag agtggttctt acttaggaaa	1080
gcctacgaaa gaaacgaagt agctccaaac aagccaagtg aagaggagta tcaaagaagg	1140
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gactatagac aaaaagcgat aaaactctta gcaaattctt tctacggata ttatggctat	1500
gcaaaagcaa gatgggtactg taaggagtgt gctgagagcg ttactgcctg gggaagaaag	1560
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gctctagaat ttgtaaaata cataaattca aagctccctg gactgctaga gcttgaatat	1740
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tacgatccca aaaagcaca gtatgacgca gaatattaca tggagaacca ggttcttcca	2220
gcggtactta ggatattgga gggatttga tacagaaagg aagacctcag ataccaaaag	2280
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<210> 33

<211> 2325

<212> DNA

<213> Thermococcus kodakaraensis

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

<400> 33

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ctcctgaagg acgattctgc cattgaggaa gtcaagaaga taaccgccga gaggcacggg	180
acggttgtaa cggttaagcg ggttgaaaag gttcagaaga agttcctcgg gagaccagtt	240
gaggtctgga aactctactt tactcatccg caggacnnnc cagcgataag ggacaagata	300
cgagagcatc cagcagttat tgacatctac gagtacgaca tacccttcgc caagcgctac	360
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agctacgccg acgaggaagg ggccaggggtg ataacttgga agaacgtgga tctcccctac	540
gttgacgtcg tctcgacgga gaggagatg ataaagcgct tcctccgtgt tgtgaaggag	600
aaagaccggc acgttctcat aacctacaac ggcgacaact tcgacttcgc ctatctgaaa	660

aagcgctgtg aaaagctcgg aataaacttc gccctcggaa gggatggaag cgagccgaag	720
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tatcctgtga taagacggac gataaacctg cccacataca cgcttgaggc cgtttatgaa	840
gccgtcttcg gtcagccgaa ggagaagggt tacgctgagg aaataaccac agcctgggaa	900
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gagcttggggaggagttcct tccgatggag gccagcttt ctcgcttaat cggccagtcc	1020
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<210> 34
 <211> 2325
 <212> DNA
 <213> Thermococcus kodakaraensis

<220>
 <221> misc_feature
 <222> (277)..(279)
 <223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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 ctctgaagg acgattctgc cattgaggaa gtcaagaaga taaccgccga gaggcacggg 180
 acggttgtaa cggttaagcg gggtgaaaag gttcagaaga agttcctcgg gagaccagtt 240
 gaggtctgga aactctactt tactcatccg caggacnnnc cagcgataag ggacaagata 300
 cgagagcatc cagcagttat tgacatctac gagtacgaca tacccttcgc caagcgctac 360
 ctcatagaca agggattagt gccaatggaa ggcgacgagg agctgaaaat gctcgccttc 420
 gacattgaaa ctctctacca tgagggcgag gagttcgccg agggggccaat ccttatgata 480
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cagaagataa agaagaagat gaaggccacg attgacccga tcgagaggaa gtcctctgat 1440
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gttgagagaa ttctgagagc cttcggttac cgcaaggaag acctgcgcta ccagaagacg 2280
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<210> 35

<211> 2325

<212> DNA

<213> *Thermococcus litoralis*

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

<400> 35

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cttctcaaag atgactccgc tattgaggag ataaaggcaa taaagggcga gagacatgga 180
aaaactgtga gagtgtcga tgcagtgaag gtcaggaaaa aatttttggg aagggaagtt 240
gaagtctgga agctcatttt cgagcatccc caagacnnnc cagctatgcg gggcaaaata 300
agggaaacatc cagctgtggt tgacattttac gaatatgaca taccctttgc caagcggttat 360
ctcatagaca agggcttgat tcccatggag ggagacgagg agcttaagct ccttgccctt 420

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gatattgaaa	cgttttatca	tgagggagat	gaatttgga	agggcgagat	aataatgatt	480
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gaaaagcttg	ttatccatga	gcagattacc	agggatttaa	aggactacaa	agccattggc	2040
cctcatgtcg	cgatagcaaa	aagacttgcc	gcaagagggg	taaaagtga	accgggcaca	2100

ataataagct atacgtttct caaagggagc ggaaagataa gcgatagggt aattttactt 2160
acagaatacg atcctagaaa acacaagtac gatccggact actacataga aaaccaagtt 2220
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caaagctcaa aacaaaccgg cttagatgca tggctcaaga ggtag 2325

<210> 36
<211> 2325
<212> DNA
<213> *Thermococcus litoralis*

<220>
<221> misc_feature
<222> (277)..(279)
<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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gtc gatgttg tgtccaatga aagagaaatg ataaagcggt ttgttcaagt tgtaaagaa 600
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<210> 37

<211> 2328

<212> DNA

<213> Pyrococcus GB-D

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

<400> 37

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<210> 38

<211> 2328

<212> DNA

<213> Pyrococcus GB-D

<220>

<221> misc_feature

<222> (277)..(279)

<223> NMN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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<210> 39

<211> 2331

<212> DNA

<213> Thermococcus sp.

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN

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<211> 2331

<212> DNA

<213> Thermococcus sp.

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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<211> 775
 <212> PRT
 <213> Pyrococcus furiosus

<400> 41

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 Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
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 Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
 565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
 580 585 590
 Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
 625 630 635 640
 Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685
 Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765
 Trp Leu Asn Ile Lys Lys Ser
 770 775
 <210> 42
 <211> 775
 <212> PRT
 <213> *Pyrococcus furiosus*
 <400> 42
 Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15
 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60

Ile	Val	Asp	Val	Glu	Lys	Val	Glu	Lys	Lys	Phe	Leu	Gly	Lys	Pro	Ile	
65					70					75					80	
Thr	Val	Trp	Lys	Leu	Tyr	Leu	Glu	His	Pro	Gln	Asp	Glu	Pro	Thr	Ile	
			85						90					95		
Arg	Glu	Lys	Val	Arg	Glu	His	Pro	Ala	Val	Val	Asp	Ile	Phe	Glu	Tyr	
			100					105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
		115					120					125				
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Ile	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
	130					135					140					
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Lys	Gly	Pro	Ile	Ile	Met	Ile	
145					150					155					160	
Ser	Tyr	Ala	Asp	Glu	Asn	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Asn	Ile	
			165						170					175		
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys	
		180						185					190			
Arg	Phe	Leu	Arg	Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr	
	195						200					205				
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu	
	210					215					220					
Lys	Leu	Gly	Ile	Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile	
			245						250					255		
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr	
		260						265					270			
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	
	275						280					285				
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn	
	290					295					300					
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr	
305					310					315					320	
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu	
			325						330					335		
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala	
	355						360					365				

Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
 370 375 380
 Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
 385 390 395 400
 Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
 405 410 415
 His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
 420 425 430
 Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
 435 440 445
 Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
 450 455 460
 Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
 465 470 475 480
 Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
 485 490 495
 Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
 500 505 510
 Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
 565 570 575
 Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
 580 585 590
 Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
 625 630 635 640
 Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685
 Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765
 Trp Leu Asn Ile Lys Lys Ser
 770 775
 <210> 43
 <211> 775
 <212> PRT
 <213> *Pyrococcus furiosus*
 <400> 43
 Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15
 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Arg Pro Thr Ile
 85 90 95
 Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile

145		150		155		160
Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile	165		170		175	
Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys	180		185		190	
Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr	195		200		205	
Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu	210		215		220	
Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys	225		230		235	240
Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile	245		250		255	
His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr	260		265		270	
Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu	275		280		285	
Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn	290		295		300	
Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr	305		310		315	320
Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu	325		330		335	
Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu	340		345		350	
Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala	355		360		365	
Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser	370		375		380	
Tyr Thr Pro Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn	385		390		395	400
Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr	405		410		415	
His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr	420		425		430	
Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly	435		440		445	
Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile						

450		455		460
Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu				
465		470		475
Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly				
	485		490	495
Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu				
	500		505	510
Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu				
	515		520	525
Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly				
	530		535	540
Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys				
	545		550	555
Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu				
	565		570	575
Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys				
	580		585	590
Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly				
	595		600	605
Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln				
	610		615	620
Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala				
	625		630	635
Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile				
	645		650	655
Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His				
	660		665	670
Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala				
	675		680	685
Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val				
	690		695	700
Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu				
	705		710	715
Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn				
	725		730	735
Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg				
	740		745	750
Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser				

755	760	765
Trp Leu Asn Ile Lys Lys Ser		
770	775	
<210> 44		
<211> 775		
<212> PRT		
<213> Pyrococcus furiosus		
<400> 44		
Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile		
1	5	10 15
Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg		
	20	25 30
Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile		
	35	40 45
Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg		
	50	55 60
Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile		
65	70	75 80
Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Arg Pro Thr Ile		
	85	90 95
Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr		
	100	105 110
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro		
	115	120 125
Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Ala Ile Ala Thr		
	130	135 140
Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile		
145	150	155 160
Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile		
	165	170 175
Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys		
	180	185 190
Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr		
	195	200 205
Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu		
	210	215 220
Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys		
225	230	235 240

Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
 245 250 255
 His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
 260 265 270
 Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
 275 280 285
 Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
 290 295 300
 Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
 305 310 315 320
 Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
 355 360 365
 Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
 370 375 380
 Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
 385 390 395 400
 Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
 405 410 415
 His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
 420 425 430
 Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
 435 440 445
 Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
 450 455 460
 Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
 465 470 475 480
 Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
 485 490 495
 Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
 500 505 510
 Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
 545 550 555 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
 565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
 580 585 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
 595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
 625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765

Trp Leu Asn Ile Lys Lys Ser
 770 775

<210> 45

<211> 775

<212> PRT

<213> *Pyrococcus furiosus*

<400> 45

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Glu Pro Thr Ile
 85 90 95
 Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
 145 150 155 160
 Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
 165 170 175
 Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
 180 185 190
 Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr
 195 200 205
 Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu
 210 215 220
 Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys
 225 230 235 240
 Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
 245 250 255
 His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
 260 265 270
 Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
 275 280 285
 Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
 290 295 300
 Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
 305 310 315 320
 Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
 325 330 335

Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
355 360 365

Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Thr Pro Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
385 390 395 400

Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
420 425 430

Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
465 470 475 480

Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
515 520 525

Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
530 535 540

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
545 550 555 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
580 585 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685
 Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765
 Trp Leu Asn Ile Lys Lys Ser
 770 775
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 <211> 775
 <212> PRT
 <213> *Pyrococcus furiosus*
 <400> 46
 Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
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 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Arg Pro Thr Ile
 85 90 95
 Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro

115	120	125
Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Ala Ile Ala Thr 130 135 140		
Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile 145 150 155 160		
Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile 165 170 175		
Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys 180 185 190		
Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr 195 200 205		
Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu 210 215 220		
Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys 225 230 235 240		
Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile 245 250 255		
His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr 260 265 270		
Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu 275 280 285		
Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn 290 295 300		
Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr 305 310 315 320		
Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu 325 330 335		
Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu 340 345 350		
Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala 355 360 365		
Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser 370 375 380		
Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn 385 390 395 400		
Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr 405 410 415		
His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr		

420					425					430						
Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly	
435					440					445						
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	
450					455					460						
Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu	
465					470					475					480	
Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	
485					490					495						
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	
500					505					510						
Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu	
515					520					525						
Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly	
530					535					540						
Leu	Tyr	Ala	Thr	Ile	Pro	Gly	Gly	Glu	Ser	Glu	Glu	Ile	Lys	Lys	Lys	
545					550					555					560	
Ala	Leu	Glu	Phe	Val	Lys	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly	Leu	Leu	
565					570					575						
Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	
580					585					590						
Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Val	Ile	Thr	Arg	Gly	
595					600					605						
Leu	Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	
610					615					620						
Ala	Arg	Val	Leu	Glu	Thr	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	
625					630					635					640	
Val	Arg	Ile	Val	Lys	Glu	Val	Ile	Gln	Lys	Leu	Ala	Asn	Tyr	Glu	Ile	
645					650					655						
Pro	Pro	Glu	Lys	Leu	Ala	Ile	Tyr	Glu	Gln	Ile	Thr	Arg	Pro	Leu	His	
660					665					670						
Glu	Tyr	Lys	Ala	Ile	Gly	Pro	His	Val	Ala	Val	Ala	Lys	Lys	Leu	Ala	
675					680					685						
Ala	Lys	Gly	Val	Lys	Ile	Lys	Pro	Gly	Met	Val	Ile	Gly	Tyr	Ile	Val	
690					695					700						
Leu	Arg	Gly	Asp	Gly	Pro	Ile	Ser	Asn	Arg	Ala	Ile	Leu	Ala	Glu	Glu	
705					710					715					720	
Tyr	Asp	Pro	Lys	Lys	His	Lys	Tyr	Asp	Ala	Glu	Tyr	Tyr	Ile	Glu	Asn	

	725		730		735
Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg					
	740		745		750
Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser					
	755		760		765
Trp Leu Asn Ile Lys Lys Ser					
	770		775		
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<213>	Thermococcus sp.				
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Val Glu Tyr Asp Arg					
	20		25		30
Asn Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Gln Ile					
	35		40		45
Asp Glu Val Arg Lys Ile Thr Ala Glu Arg His Gly Lys Ile Val Arg					
	50		55		60
Ile Ile Asp Ala Glu Lys Val Arg Lys Lys Phe Leu Gly Arg Pro Ile					
65	70		75		80
Glu Val Trp Arg Leu Tyr Phe Glu His Pro Gln Asp Arg Pro Ala Ile					
	85		90		95
Arg Asp Lys Ile Arg Glu His Ser Ala Val Ile Asp Ile Phe Glu Tyr					
	100		105		110
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro					
	115		120		125
Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr					
	130		135		140
Leu Tyr His Glu Gly Glu Glu Phe Ala Lys Gly Pro Ile Ile Met Ile					
145	150		155		160
Ser Tyr Ala Asp Glu Glu Glu Ala Lys Val Ile Thr Trp Lys Lys Ile					
	165		170		175
Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys					
	180		185		190
Arg Phe Leu Lys Val Ile Arg Glu Lys Asp Pro Asp Val Ile Ile Thr					
	195		200		205

Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Leu	Pro	Tyr	Leu	Val	Lys	Arg	Ala	Glu	210	215	220
Lys	Leu	Gly	Ile	Lys	Leu	Pro	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	225	230	235
Met	Gln	Arg	Leu	Gly	Asp	Met	Thr	Ala	Val	Glu	Ile	Lys	Gly	Arg	Ile	245	250	255
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	260	265	270
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	275	280	285
Lys	Val	Tyr	Ala	His	Glu	Ile	Ala	Glu	Ala	Trp	Glu	Thr	Gly	Lys	Gly	290	295	300
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr	305	310	315
Glu	Leu	Gly	Arg	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	325	330	335
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	340	345	350
Val	Glu	Trp	Tyr	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	355	360	365
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Tyr	Glu	Arg	Arg	Leu	Arg	Glu	Ser	370	375	380
Tyr	Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Gly	385	390	395
Leu	Val	Ser	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	405	410	415
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Arg	Glu	Tyr	420	425	430
Asp	Val	Ala	Pro	Glu	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	435	440	445
Phe	Ile	Pro	Ser	Leu	Leu	Lys	Arg	Leu	Leu	Asp	Glu	Arg	Gln	Glu	Ile	450	455	460
Lys	Arg	Lys	Met	Lys	Ala	Ser	Lys	Asp	Pro	Ile	Glu	Lys	Lys	Met	Leu	465	470	475
Asp	Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	485	490	495
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	500	505	510

Ser Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Phe Val Arg Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Ala Lys Pro Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu
 565 570 575
 Glu Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys
 580 585 590
 Lys Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu Glu Ala
 625 630 635 640
 Val Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala
 675 680 685
 Ala Arg Gly Val Lys Val Arg Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Phe Asp Leu Arg Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Trp Gln Lys Thr Lys Gln Thr Gly Leu Thr Ala
 755 760 765
 Trp Leu Asn Ile Lys Lys Lys
 770 775

<210> 48
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 <212> PRT
 <213> Thermococcus sp.

<400> 48

Met	Ile	Leu	Asp	Ala	Asp	Tyr	Ile	Thr	Glu	Asp	Gly	Lys	Pro	Ile	Ile	1	5	10	15
Arg	Ile	Phe	Lys	Lys	Glu	Asn	Gly	Glu	Phe	Lys	Val	Glu	Tyr	Asp	Arg	20	25	30	
Asn	Phe	Arg	Pro	Tyr	Ile	Tyr	Ala	Leu	Leu	Lys	Asp	Asp	Ser	Gln	Ile	35	40	45	
Asp	Glu	Val	Arg	Lys	Ile	Thr	Ala	Glu	Arg	His	Gly	Lys	Ile	Val	Arg	50	55	60	
Ile	Ile	Asp	Ala	Glu	Lys	Val	Arg	Lys	Lys	Phe	Leu	Gly	Arg	Pro	Ile	65	70	75	80
Glu	Val	Trp	Arg	Leu	Tyr	Phe	Glu	His	Pro	Gln	Asp	Glu	Pro	Ala	Ile	85	90	95	
Arg	Asp	Lys	Ile	Arg	Glu	His	Ser	Ala	Val	Ile	Asp	Ile	Phe	Glu	Tyr	100	105	110	
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	115	120	125	
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Leu	Leu	Ala	Phe	Asp	Ile	Glu	Thr	130	135	140	
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Lys	Gly	Pro	Ile	Ile	Met	Ile	145	150	155	160
Ser	Tyr	Ala	Asp	Glu	Glu	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Lys	Ile	165	170	175	
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys	180	185	190	
Arg	Phe	Leu	Lys	Val	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Val	Ile	Ile	Thr	195	200	205	
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Leu	Pro	Tyr	Leu	Val	Lys	Arg	Ala	Glu	210	215	220	
Lys	Leu	Gly	Ile	Lys	Leu	Pro	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	225	230	235	240
Met	Gln	Arg	Leu	Gly	Asp	Met	Thr	Ala	Val	Glu	Ile	Lys	Gly	Arg	Ile	245	250	255	
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	260	265	270	
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	275	280	285	

Lys Val Tyr Ala His Glu Ile Ala Glu Ala Trp Glu Thr Gly Lys Gly
 290 295 300
 Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
 305 310 315 320
 Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Tyr Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
 355 360 365
 Pro Asn Lys Pro Asp Glu Arg Glu Tyr Glu Arg Arg Leu Arg Glu Ser
 370 375 380
 Tyr Ala Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly
 385 390 395 400
 Leu Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
 405 410 415
 His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Glu Tyr
 420 425 430
 Asp Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly
 435 440 445
 Phe Ile Pro Ser Leu Leu Lys Arg Leu Leu Asp Glu Arg Gln Glu Ile
 450 455 460
 Lys Arg Lys Met Lys Ala Ser Lys Asp Pro Ile Glu Lys Lys Met Leu
 465 470 475 480
 Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly
 485 490 495
 Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
 500 505 510
 Ser Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Phe Val Arg Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Ala Lys Pro Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu
 565 570 575
 Glu Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys
 580 585 590

Lys Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu Glu Ala
 625 630 635 640
 Val Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala
 675 680 685
 Ala Arg Gly Val Lys Val Arg Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Phe Asp Leu Arg Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Trp Gln Lys Thr Lys Gln Thr Gly Leu Thr Ala
 755 760 765
 Trp Leu Asn Ile Lys Lys Lys
 770 775
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 Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
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 Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
 20 25 30
 Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
 35 40 45
 Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
 50 55 60
 Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile

65	70					75					80				
Glu Val Trp Lys	Leu Tyr Phe Thr His	Pro Gln Asp Arg	Pro Ala Ile	85	90	95									
Arg Asp Lys Ile	Lys Glu His Pro Ala	Val Val Asp Ile	Tyr Glu Tyr	100	105	110									
Asp Ile Pro Phe	Ala Lys Arg Tyr	Leu Ile Asp Lys	Gly Leu Ile Pro	115	120	125									
Met Glu Gly Asp	Glu Glu Leu Lys	Met Leu Ala Phe	Asp Ile Glu Thr	130	135	140									
Leu Tyr His Glu	Gly Glu Glu Phe	Ala Glu Gly Pro	Ile Leu Met Ile	145	150	155									
Ser Tyr Ala Asp	Glu Glu Gly Ala	Arg Val Ile Thr	Trp Lys Asn Ile	165	170	175									
Asp Leu Pro Tyr	Val Asp Val Val	Ser Thr Glu Lys	Glu Met Ile Lys	180	185	190									
Arg Phe Leu Lys	Val Val Lys Glu	Lys Asp Pro Asp	Val Leu Ile Thr	195	200	205									
Tyr Asn Gly Asp	Asn Phe Asp Phe	Ala Tyr Leu Lys	Lys Arg Ser Glu	210	215	220									
Lys Leu Gly Val	Lys Phe Ile Leu	Gly Arg Glu Gly	Ser Glu Pro Lys	225	230	235									
Ile Gln Arg Met	Gly Asp Arg Phe	Ala Val Glu Val	Lys Gly Arg Ile	245	250	255									
His Phe Asp Leu	Tyr Pro Val Ile	Arg Arg Thr Ile	Asn Leu Pro Thr	260	265	270									
Tyr Thr Leu Glu	Ala Val Tyr Glu	Ala Ile Phe Gly	Gln Pro Lys Glu	275	280	285									
Lys Val Tyr Ala	Glu Glu Ile Ala	Gln Ala Trp Glu	Thr Gly Glu Gly	290	295	300									
Leu Glu Arg Val	Ala Arg Tyr Ser	Met Glu Asp Ala	Lys Val Thr Tyr	305	310	315									
Glu Leu Gly Lys	Glu Phe Phe Pro	Met Glu Ala Gln	Leu Ser Arg Leu	325	330	335									
Val Gly Gln Ser	Leu Trp Asp Val	Ser Arg Ser Ser	Thr Gly Asn Leu	340	345	350									
Val Glu Trp Phe	Leu Leu Arg Lys	Ala Tyr Glu Arg	Asn Glu Leu Ala	355	360	365									
Pro Asn Lys Pro	Asp Glu Arg Glu	Leu Ala Arg Arg	Glu Ser Tyr												

370	375	380
Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile 385 390 395 400		
Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His 405 410 415		
Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp 420 425 430		
Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe 435 440 445		
Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys 450 455 460		
Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp 465 470 475 480		
Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr 485 490 495		
Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser 500 505 510		
Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile 515 520 525		
Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe 530 535 540		
Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala 545 550 555 560		
Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu 565 570 575		
Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys 580 585 590		
Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu 595 600 605		
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala 610 615 620		
Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val 625 630 635 640		
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro 645 650 655		
Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp 660 665 670		

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
 755 760 765
 Leu Lys Pro Lys Thr
 770
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 <212> PRT
 <213> Thermococcus gorgonarius
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 Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
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 Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
 20 25 30
 Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
 35 40 45
 Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
 50 55 60
 Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
 65 70 75 80
 Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Glu Pro Ala Ile
 85 90 95
 Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
 145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
 165 170 175
 Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
 180 185 190
 Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
 195 200 205
 Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
 210 215 220
 Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
 225 230 235 240
 Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
 245 250 255
 His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
 260 265 270
 Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
 275 280 285
 Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
 290 295 300
 Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
 305 310 315 320
 Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
 355 360 365
 Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
 370 375 380
 Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
 385 390 395 400
 Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
 405 410 415
 Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
 420 425 430
 Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
 435 440 445
 Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
 450 455 460

Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
 465 470 475 480
 Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
 485 490 495
 Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
 500 505 510
 Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
 515 520 525
 Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
 530 535 540
 Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560
 Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
 565 570 575
 Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590
 Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
 595 600 605
 Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
 625 630 635 640
 Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
 755 760 765

Leu Lys Pro Lys Thr
770

<210> 51
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<212> PRT
<213> Thermococcus kodakaraensis

<400> 51

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
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Thr Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Val Val Thr
50 55 60

Val Lys Arg Val Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Val
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Arg Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Gly Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Val Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Gln Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Val
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Lys Leu Gly Ile Asn Phe Ala Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile

245							250						255				
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr		
			260					265					270				
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Gln	Pro	Lys	Glu		
			275					280					285				
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Thr	Pro	Ala	Trp	Glu	Thr	Gly	Glu	Asn		
			290					295					300				
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr		
305						310					315					320	
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu		
			325					330					335				
Ile	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu		
			340					345					350				
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala		
			355					360					365				
Pro	Asn	Lys	Pro	Asp	Glu	Lys	Glu	Leu	Ala	Arg	Arg	Arg	Gln	Ser	Tyr		
370						375					380						
Glu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile		
385						390					395					400	
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His		
			405					410					415				
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Lys	Glu	Tyr	Asp		
			420					425					430				
Val	Ala	Pro	Gln	Val	Gly	His	Arg	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe		
			435					440					445				
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	Lys		
450						455					460						
Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Arg	Lys	Leu	Leu	Asp		
465						470					475					480	
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	Tyr		
			485					490					495				
Tyr	Gly	Tyr	Ala	Arg	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser		
			500					505					510				
Val	Thr	Ala	Trp	Gly	Arg	Glu	Tyr	Ile	Thr	Met	Thr	Ile	Lys	Glu	Ile		
			515					520					525				
Glu	Glu	Lys	Tyr	Gly	Phe	Lys	Val	Ile	Tyr	Ser	Asp	Thr	Asp	Gly	Phe		
530						535					540						

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560
Met Glu Phe Leu Asn Tyr Ile Asn Ala Lys Leu Pro Gly Ala Leu Glu
565 570 575
Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
580 585 590
Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
595 600 605
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620
Arg Val Leu Glu Ala Leu Leu Lys Asp Gly Asp Val Glu Lys Ala Val
625 630 635 640
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655
Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Lys Asp
660 665 670
Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685
Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700
Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720
Asp Pro Thr Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735
Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
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Glu	Glu	Val	Lys	Lys	Ile	Thr	Ala	Glu	Arg	His	Gly	Thr	Val	Val	Thr	50	55	60	
Val	Lys	Arg	Val	Glu	Lys	Val	Gln	Lys	Lys	Phe	Leu	Gly	Arg	Pro	Val	65	70	75	80
Glu	Val	Trp	Lys	Leu	Tyr	Phe	Thr	His	Pro	Gln	Asp	Glu	Pro	Ala	Ile	85	90	95	
Arg	Asp	Lys	Ile	Arg	Glu	His	Gly	Ala	Val	Ile	Asp	Ile	Tyr	Glu	Tyr	100	105	110	
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Val	Pro	115	120	125	
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Met	Leu	Ala	Phe	Asp	Ile	Gln	Thr	130	135	140	
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Glu	Gly	Pro	Ile	Leu	Met	Ile	145	150	155	160
Ser	Tyr	Ala	Asp	Glu	Glu	Gly	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Val	165	170	175	
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Thr	Glu	Arg	Glu	Met	Ile	Lys	180	185	190	
Arg	Phe	Leu	Arg	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr	195	200	205	
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Cys	Glu	210	215	220	
Lys	Leu	Gly	Ile	Asn	Phe	Ala	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	225	230	235	240
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile	245	250	255	
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	260	265	270	
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Gln	Pro	Lys	Glu	275	280	285	
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Thr	Pro	Ala	Trp	Glu	Thr	Gly	Glu	Asn	290	295	300	
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr	305	310	315	320
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	325	330	335	

Ile Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
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 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
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 Pro Asn Lys Pro Asp Glu Lys Glu Leu Ala Arg Arg Arg Gln Ser Tyr
 370 375 380
 Glu Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
 385 390 395 400
 Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
 405 410 415
 Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Lys Glu Tyr Asp
 420 425 430
 Val Ala Pro Gln Val Gly His Arg Phe Cys Lys Asp Phe Pro Gly Phe
 435 440 445
 Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Ile Lys
 450 455 460
 Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Arg Lys Leu Leu Asp
 465 470 475 480
 Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr
 485 490 495
 Tyr Gly Tyr Ala Arg Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
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 Val Thr Ala Trp Gly Arg Glu Tyr Ile Thr Met Thr Ile Lys Glu Ile
 515 520 525
 Glu Glu Lys Tyr Gly Phe Lys Val Ile Tyr Ser Asp Thr Asp Gly Phe
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 Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560
 Met Glu Phe Leu Asn Tyr Ile Asn Ala Lys Leu Pro Gly Ala Leu Glu
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 Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590
 Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
 595 600 605
 Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Leu Leu Lys Asp Gly Asp Val Glu Lys Ala Val
 625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
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 Asp Pro Thr Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
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 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
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 35 40 45
 Glu Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Thr Val Arg
 50 55 60
 Val Leu Asp Ala Val Lys Val Arg Lys Lys Phe Leu Gly Arg Glu Val
 65 70 75 80
 Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Arg Pro Ala Met
 85 90 95
 Arg Gly Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro

115					120					125						
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Leu	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
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Phe	Tyr	His	Glu	Gly	Asp	Glu	Phe	Gly	Lys	Gly	Glu	Ile	Ile	Met	Ile	
145					150					155					160	
Ser	Tyr	Ala	Asp	Glu	Glu	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Ile		
165					170					175						
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Asn	Glu	Arg	Glu	Met	Ile	Lys	
180					185					190						
Arg	Phe	Val	Gln	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Ile	Ile	Thr	
195					200					205						
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Leu	Pro	Tyr	Leu	Ile	Lys	Arg	Ala	Glu	
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Lys	Leu	Gly	Val	Arg	Leu	Val	Leu	Gly	Arg	Asp	Lys	Glu	His	Pro	Glu	
225					230					235					240	
Pro	Lys	Ile	Gln	Arg	Met	Gly	Asp	Ser	Phe	Ala	Val	Glu	Ile	Lys	Gly	
245					250					255						
Arg	Ile	His	Phe	Asp	Leu	Phe	Pro	Val	Val	Arg	Arg	Thr	Ile	Asn	Leu	
260					265					270						
Pro	Thr	Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Leu	Gly	Lys	Thr	
275					280					285						
Lys	Ser	Lys	Leu	Gly	Ala	Glu	Glu	Ile	Ala	Ala	Ile	Trp	Glu	Thr	Glu	
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Glu	Ser	Met	Lys	Lys	Leu	Ala	Gln	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Ala	
305					310					315					320	
Thr	Tyr	Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Glu	Leu	Ala	
325					330					335						
Lys	Leu	Ile	Gly	Gln	Ser	Val	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	
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Asn	Leu	Val	Glu	Trp	Tyr	Leu	Leu	Arg	Val	Ala	Tyr	Ala	Arg	Asn	Glu	
355					360					365						
Leu	Ala	Pro	Asn	Lys	Pro	Asp	Glu	Glu	Glu	Tyr	Lys	Arg	Arg	Leu	Arg	
370					375					380						
Thr	Thr	Tyr	Leu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	
385					390					395					400	
Glu	Asn	Ile	Ile	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	
405					410					415						
Val	Thr	His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Glu	Lys	Glu	Gly	Cys	Lys	

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Asn	Tyr	Asp	Val	Ala	Pro	Ile	Val	Gly	Tyr	Arg	Phe	Cys	Lys	Asp	Phe
		435					440					445			
Pro	Gly	Phe	Ile	Pro	Ser	Ile	Leu	Gly	Asp	Leu	Ile	Ala	Met	Arg	Gln
	450					455					460				
Asp	Ile	Lys	Lys	Lys	Met	Lys	Ser	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys
465					470					475					480
Met	Leu	Asp	Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Tyr
				485					490					495	
Tyr	Gly	Tyr	Met	Gly	Tyr	Pro	Lys	Ala	Arg	Trp	Tyr	Ser	Lys	Glu	Cys
			500					505					510		
Ala	Glu	Ser	Val	Thr	Ala	Trp	Gly	Arg	His	Tyr	Ile	Glu	Met	Thr	Ile
		515					520					525			
Arg	Glu	Ile	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr
	530					535					540				
Asp	Gly	Phe	Tyr	Ala	Thr	Ile	Pro	Gly	Glu	Lys	Pro	Glu	Leu	Ile	Lys
545					550					555					560
Lys	Lys	Ala	Lys	Glu	Phe	Leu	Asn	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly
				565					570					575	
Leu	Leu	Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Leu	Arg	Gly	Phe	Phe	Val
			580					585					590		
Thr	Lys	Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Arg	Ile	Thr	Thr
		595					600					605			
Arg	Gly	Leu	Glu	Val	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu
	610					615					620				
Thr	Gln	Ala	Lys	Val	Leu	Glu	Ala	Ile	Leu	Lys	Glu	Gly	Ser	Val	Glu
625					630					635					640
Lys	Ala	Val	Glu	Val	Val	Arg	Asp	Val	Val	Glu	Lys	Ile	Ala	Lys	Tyr
				645					650					655	
Arg	Val	Pro	Leu	Glu	Lys	Leu	Val	Ile	His	Glu	Gln	Ile	Thr	Arg	Asp
			660					665					670		
Leu	Lys	Asp	Tyr	Lys	Ala	Ile	Gly	Pro	His	Val	Ala	Ile	Ala	Lys	Arg
		675					680					685			
Leu	Ala	Ala	Arg	Gly	Ile	Lys	Val	Lys	Pro	Gly	Thr	Ile	Ile	Ser	Tyr
	690					695					700				
Ile	Val	Leu	Lys	Gly	Ser	Gly	Lys	Ile	Ser	Asp	Arg	Val	Ile	Leu	Leu
705					710					715					720
Thr	Glu	Tyr	Asp	Pro	Arg	Lys	His	Lys	Tyr	Asp	Pro	Asp	Tyr	Tyr	Ile

	725		730		735
Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly					
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Tyr Arg Lys Glu Asp Leu Arg Tyr Gln Ser Ser Lys Gln Thr Gly Leu					
	755		760		765
Asp Ala Trp Leu Lys Arg					
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Leu Asp Pro					
	20		25		30
His Phe Gln Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile					
	35		40		45
Glu Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Thr Val Arg					
	50		55		60
Val Leu Asp Ala Val Lys Val Arg Lys Lys Phe Leu Gly Arg Glu Val					
65	70		75		80
Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Glu Pro Ala Met					
	85		90		95
Arg Gly Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr					
	100		105		110
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro					
	115		120		125
Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr					
	130		135		140
Phe Tyr His Glu Gly Asp Glu Phe Gly Lys Gly Glu Ile Ile Met Ile					
145	150		155		160
Ser Tyr Ala Asp Glu Glu Glu Ala Arg Val Ile Thr Trp Lys Asn Ile					
	165		170		175
Asp Leu Pro Tyr Val Asp Val Val Ser Asn Glu Arg Glu Met Ile Lys					
	180		185		190
Arg Phe Val Gln Val Val Lys Glu Lys Asp Pro Asp Val Ile Ile Thr					
	195		200		205

Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Leu	Pro	Tyr	Leu	Ile	Lys	Arg	Ala	Glu	210	215	220
Lys	Leu	Gly	Val	Arg	Leu	Val	Leu	Gly	Arg	Asp	Lys	Glu	His	Pro	Glu	225	230	235
Pro	Lys	Ile	Gln	Arg	Met	Gly	Asp	Ser	Phe	Ala	Val	Glu	Ile	Lys	Gly	245	250	255
Arg	Ile	His	Phe	Asp	Leu	Phe	Pro	Val	Val	Arg	Arg	Thr	Ile	Asn	Leu	260	265	270
Pro	Thr	Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Leu	Gly	Lys	Thr	275	280	285
Lys	Ser	Lys	Leu	Gly	Ala	Glu	Glu	Ile	Ala	Ala	Ile	Trp	Glu	Thr	Glu	290	295	300
Glu	Ser	Met	Lys	Lys	Leu	Ala	Gln	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Ala	305	310	315
Thr	Tyr	Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Glu	Leu	Ala	325	330	335
Lys	Leu	Ile	Gly	Gln	Ser	Val	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	340	345	350
Asn	Leu	Val	Glu	Trp	Tyr	Leu	Leu	Arg	Val	Ala	Tyr	Ala	Arg	Asn	Glu	355	360	365
Leu	Ala	Pro	Asn	Lys	Pro	Asp	Glu	Glu	Glu	Tyr	Lys	Arg	Arg	Leu	Arg	370	375	380
Thr	Thr	Tyr	Leu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	385	390	395
Glu	Asn	Ile	Ile	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	405	410	415
Val	Thr	His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Glu	Lys	Glu	Gly	Cys	Lys	420	425	430
Asn	Tyr	Asp	Val	Ala	Pro	Ile	Val	Gly	Tyr	Arg	Phe	Cys	Lys	Asp	Phe	435	440	445
Pro	Gly	Phe	Ile	Pro	Ser	Ile	Leu	Gly	Asp	Leu	Ile	Ala	Met	Arg	Gln	450	455	460
Asp	Ile	Lys	Lys	Lys	Met	Lys	Ser	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys	465	470	475
Met	Leu	Asp	Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Tyr	485	490	495
Tyr	Gly	Tyr	Met	Gly	Tyr	Pro	Lys	Ala	Arg	Trp	Tyr	Ser	Lys	Glu	Cys	500	505	510

Ala Glu Ser Val Thr Ala Trp Gly Arg His Tyr Ile Glu Met Thr Ile
 515 520 525
 Arg Glu Ile Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr
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 Asp Gly Phe Tyr Ala Thr Ile Pro Gly Glu Lys Pro Glu Leu Ile Lys
 545 550 555 560
 Lys Lys Ala Lys Glu Phe Leu Asn Tyr Ile Asn Ser Lys Leu Pro Gly
 565 570 575
 Leu Leu Glu Leu Glu Tyr Glu Gly Phe Tyr Leu Arg Gly Phe Phe Val
 580 585 590
 Thr Lys Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Arg Ile Thr Thr
 595 600 605
 Arg Gly Leu Glu Val Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu
 610 615 620
 Thr Gln Ala Lys Val Leu Glu Ala Ile Leu Lys Glu Gly Ser Val Glu
 625 630 635 640
 Lys Ala Val Glu Val Val Arg Asp Val Val Glu Lys Ile Ala Lys Tyr
 645 650 655
 Arg Val Pro Leu Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp
 660 665 670
 Leu Lys Asp Tyr Lys Ala Ile Gly Pro His Val Ala Ile Ala Lys Arg
 675 680 685
 Leu Ala Ala Arg Gly Ile Lys Val Lys Pro Gly Thr Ile Ile Ser Tyr
 690 695 700
 Ile Val Leu Lys Gly Ser Gly Lys Ile Ser Asp Arg Val Ile Leu Leu
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 Thr Glu Tyr Asp Pro Arg Lys His Lys Tyr Asp Pro Asp Tyr Tyr Ile
 725 730 735
 Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly
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 Tyr Arg Lys Glu Asp Leu Arg Tyr Gln Ser Ser Lys Gln Thr Gly Leu
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 Asp Ala Trp Leu Lys Arg
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<211> 776

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<400> 55

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			20					25					30			
Glu	Phe	Glu	Pro	Tyr	Phe	Tyr	Ala	Leu	Leu	Arg	Asp	Asp	Ser	Ala	Ile	
		35					40					45				
Glu	Glu	Ile	Lys	Lys	Ile	Thr	Ala	Glu	Arg	His	Gly	Arg	Val	Val	Lys	
	50					55					60					
Val	Lys	Arg	Ala	Glu	Lys	Val	Lys	Lys	Lys	Phe	Leu	Gly	Arg	Ser	Val	
65					70					75					80	
Glu	Val	Trp	Val	Leu	Tyr	Phe	Thr	His	Pro	Gln	Asp	Arg	Pro	Ala	Ile	
			85						90					95		
Arg	Asp	Lys	Ile	Arg	Lys	His	Pro	Ala	Val	Ile	Asp	Ile	Tyr	Glu	Tyr	
		100						105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
		115					120					125				
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Leu	Met	Ser	Phe	Asp	Ile	Glu	Thr	
	130					135					140					
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Thr	Gly	Pro	Ile	Leu	Met	Ile	
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Ser	Tyr	Ala	Asp	Glu	Ser	Glu	Ala	Arg	Val	Ile	Thr	Trp	Lys	Lys	Ile	
			165						170					175		
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys	
			180					185					190			
Arg	Phe	Leu	Arg	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr	
		195					200					205				
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Cys	Glu	
	210					215					220					
Lys	Leu	Gly	Val	Ser	Phe	Thr	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Val	
				245					250					255		
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	
			260					265					270			
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Lys	Pro	Lys	Glu	
		275					280					285				
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Thr	Ala	Trp	Glu	Thr	Gly	Glu	Gly	
	290					295					300					

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Arg Val Thr Tyr
 305 310 315 320
 Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
 325 330 335
 Ile Gly Gln Gly Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
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 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
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 Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Gly Gly Tyr
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 Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Asp Asn Ile
 385 390 395 400
 Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
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 Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Ser Tyr Asp
 420 425 430
 Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
 435 440 445
 Ile Pro Ser Leu Leu Gly Asn Leu Leu Glu Glu Arg Gln Lys Ile Lys
 450 455 460
 Arg Lys Met Lys Ala Thr Leu Asp Pro Leu Glu Lys Asn Leu Leu Asp
 465 470 475 480
 Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr
 485 490 495
 Tyr Gly Tyr Ala Arg Ala Arg Trp Tyr Cys Arg Glu Cys Ala Glu Ser
 500 505 510
 Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Met Val Ile Arg Glu Leu
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 Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Leu
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 His Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560
 Met Glu Phe Leu Asn Tyr Ile Asn Pro Lys Leu Pro Gly Leu Leu Glu
 565 570 575
 Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590
 Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
 595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Ile Leu Arg His Gly Asp Val Glu Glu Ala Val
 625 630 635 640
 Arg Ile Val Arg Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Glu Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Ile Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Thr Lys His Lys Tyr Asp Ala Asp Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
 755 760 765
 Leu Lys Pro Lys Gly Lys Lys Lys
 770 775

<210> 56
 <211> 776
 <212> PRT
 <213> Pyrococcus GB-D

<400> 56

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Asn Gly Lys Pro Val Ile
 1 5 10 15
 Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Arg Ile Glu Tyr Asp Arg
 20 25 30
 Glu Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Arg Asp Asp Ser Ala Ile
 35 40 45
 Glu Glu Ile Lys Lys Ile Thr Ala Glu Arg His Gly Arg Val Val Lys
 50 55 60
 Val Lys Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Ser Val
 65 70 75 80
 Glu Val Trp Val Leu Tyr Phe Thr His Pro Gln Asp Glu Pro Ala Ile

85					90					95					
Arg	Asp	Lys	Ile	Arg	Lys	His	Pro	Ala	Val	Ile	Asp	Ile	Tyr	Glu	Tyr
			100					105					110		
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro
		115					120					125			
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Leu	Met	Ser	Phe	Asp	Ile	Glu	Thr
	130					135					140				
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Thr	Gly	Pro	Ile	Leu	Met	Ile
145					150					155					160
Ser	Tyr	Ala	Asp	Glu	Ser	Glu	Ala	Arg	Val	Ile	Thr	Trp	Lys	Lys	Ile
			165						170					175	
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys
			180					185					190		
Arg	Phe	Leu	Arg	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr
		195					200					205			
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Cys	Glu
	210					215					220				
Lys	Leu	Gly	Val	Ser	Phe	Thr	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys
225					230					235					240
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Val
				245					250					255	
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr
			260					265					270		
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Lys	Pro	Lys	Glu
		275					280					285			
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Thr	Ala	Trp	Glu	Thr	Gly	Glu	Gly
	290					295					300				
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Val	Thr	Tyr
305					310					315					320
Glu	Leu	Gly	Arg	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu
				325					330					335	
Ile	Gly	Gln	Gly	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu
			340					345					350		
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala
		355					360					365			
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Gly	Gly	Tyr
	370					375					380				
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Asp	Asn	Ile

385		390		395		400
Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His						
	405			410		415
Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Ser Tyr Asp						
	420			425		430
Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe						
	435			440		445
Ile Pro Ser Leu Leu Gly Asn Leu Leu Glu Glu Arg Gln Lys Ile Lys						
	450			455		460
Arg Lys Met Lys Ala Thr Leu Asp Pro Leu Glu Lys Asn Leu Leu Asp						
	465			470		475
Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr						
	485			490		495
Tyr Gly Tyr Ala Arg Ala Arg Trp Tyr Cys Arg Glu Cys Ala Glu Ser						
	500			505		510
Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Met Val Ile Arg Glu Leu						
	515			520		525
Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Leu						
	530			535		540
His Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala						
	545			550		555
Met Glu Phe Leu Asn Tyr Ile Asn Pro Lys Leu Pro Gly Leu Leu Glu						
	565			570		575
Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys Lys						
	580			585		590
Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu						
	595			600		605
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala						
	610			615		620
Arg Val Leu Glu Ala Ile Leu Arg His Gly Asp Val Glu Glu Ala Val						
	625			630		635
Arg Ile Val Arg Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro						
	645			650		655
Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Glu Leu Lys Asp						
	660			665		670
Tyr Lys Ala Thr Gly Pro His Val Ala Ile Ala Lys Arg Leu Ala Ala						
	675			680		685
Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu						

690	695	700
Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe 705 710 715 720		
Asp Pro Thr Lys His Lys Tyr Asp Ala Asp Tyr Tyr Ile Glu Asn Gln 725 730 735		
Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys 740 745 750		
Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp 755 760 765		
Leu Lys Pro Lys Gly Lys Lys Lys 770 775		

<210> 57
 <211> 2322
 <212> DNA
 <213> Thermococcus gorgonarius

<220>
 <221> misc_feature
 <222> (277)..(279)
 <223> NNN = AGA, AGG, CGA, CGC, CGG, CGT

<220>
 <221> CDS
 <222> (1)..(2322)
 <223>

<400> 57	
atg atc ctc gat aca gac tac ata act gag gat gga aag ccc gtc atc Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile 1 5 10 15	48
agg atc ttc aag aag gag aac ggc gag ttc aaa ata gac tac gac aga Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg 20 25 30	96
aac ttt gag cca tac atc tac gcg ctc ttg aag gac gac tct gcg att Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile 35 40 45	144
gag gac gtc aag aag ata act gcc gag agg cac ggc act acc gtt agg Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg 50 55 60	192
gtt gtc agg gcc gag aaa gtg aag aag aag ttc cta ggc agg ccg ata Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile 65 70 75 80	240
gag gtc tgg aag ctc tac ttc act cac ccc cag gac nnn ccc gca atc Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile 85 90 95	288

agg gac aag ata aag gag cat cct gcc gtt gtg gac atc tac gag tac	336
Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr	
100 105 110	
gac atc ccc ttc gcg aag cgc tac ctc ata gac aaa ggc tta atc ccg	384
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro	
115 120 125	
atg gag ggc gac gag gaa ctt aag atg ctc gcc ttc gac atc gag acg	432
Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr	
130 135 140	
ctc tat cac gag ggc gag gag ttc gcc gaa ggg cct atc ctg atg ata	480
Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile	
145 150 155 160	
agc tac gcc gac gag gaa ggg gcg cgc gtt att acc tgg aag aat atc	528
Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile	
165 170 175	
gac ctt ccc tat gtc gac gtc gtt tcc acc gag aag gag atg ata aag	576
Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys	
180 185 190	
cgc ttc ctc aag gtc gtc aag gaa aag gat ccc gac gtc ctc ata acc	624
Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr	
195 200 205	
tac aac ggc gac aac ttc gac ttc gcc tac ctc aag aag cgc tcc gag	672
Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu	
210 215 220	
aag ctc gga gtc aag ttc atc ctc gga agg gaa ggg agc gag ccg aaa	720
Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys	
225 230 235 240	
atc cag cgc atg ggc gat cgc ttt gcg gtg gag gtc aag gga agg att	768
Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile	
245 250 255	
cac ttc gac ctc tac ccc gtc att agg aga acg att aac ctc ccc act	816
His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr	
260 265 270	
tac acc ctt gag gca gta tat gaa gcc atc ttt gga cag ccg aag gag	864
Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu	
275 280 285	
aag gtc tac gct gag gag ata gcg cag gcc tgg gaa acg ggc gag gga	912
Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly	
290 295 300	
tta gaa agg gtg gcc cgc tac tcg atg gag gac gca aag gta acc tat	960
Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr	
305 310 315 320	
gaa ctc gga aaa gag ttc ttc cct atg gaa gcc cag ctc tcg cgc ctc	1008

Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu		
				325					330					335			
gta	ggc	cag	agc	ctc	tgg	gat	gta	tct	cgc	tcg	agt	acc	gga	aac	ctc		1056
Val	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu		
			340					345					350				
gtc	gag	tgg	ttt	ttg	ctg	agg	aag	gcc	tac	gag	agg	aat	gaa	ctt	gca		1104
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala		
		355					360					365					
cca	aac	aag	ccg	gac	gag	agg	gag	ctg	gca	aga	aga	agg	gag	agc	tac		1152
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Glu	Ser	Tyr		
	370					375					380						
gcg	ggt	gga	tac	gtc	aag	gag	ccc	gaa	agg	gga	ctg	tgg	gag	aac	atc		1200
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile		
385					390				395						400		
gtg	tat	ctg	gac	ttc	cgc	tcc	ctg	tat	cct	tcg	ata	ata	atc	acc	cat		1248
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His		
			405					410						415			
aac	gtc	tcc	cct	gat	aca	ctc	aac	agg	gag	ggt	tgt	gag	gag	tac	gac		1296
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Glu	Glu	Tyr	Asp		
			420					425					430				
gtg	gct	cct	cag	gta	ggc	cat	aag	ttc	tgc	aag	gac	ttc	ccc	ggc	ttc		1344
Val	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe		
		435					440					445					
atc	cca	agc	ctc	ctc	gga	gac	ctc	ttg	gag	gag	aga	cag	aag	gta	aag		1392
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Val	Lys		
	450					455					460						
aag	aag	atg	aag	gcc	act	ata	gac	cca	atc	gag	aag	aaa	ctc	ctc	gat		1440
Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys	Leu	Leu	Asp		
465					470				475						480		
tac	agg	caa	cga	gca	atc	aaa	atc	ctt	gct	aat	agc	ttc	tac	ggt	tac		1488
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	Tyr		
			485					490						495			
tac	ggc	tat	gca	aag	gcc	cgc	tgg	tac	tgc	aag	gag	tgc	gcc	gag	agc		1536
Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser		
			500					505					510				
gtt	acc	gct	tgg	ggc	agg	cag	tac	atc	gag	acc	acg	ata	agg	gaa	ata		1584
Val	Thr	Ala	Trp	Gly	Arg	Gln	Tyr	Ile	Glu	Thr	Thr	Ile	Arg	Glu	Ile		
		515					520					525					
gag	gag	aaa	ttt	ggc	ttt	aaa	gtc	ctc	tac	gcg	gac	aca	gat	gga	ttt		1632
Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr	Asp	Gly	Phe		
	530					535					540						
ttc	gca	aca	ata	cct	gga	gcg	gac	gcc	gaa	acc	gtc	aaa	aag	aag	gca		1680
Phe	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala		

545	550	555	560	
aag gag ttc ctg gac tac atc aac gcc aaa ctg ccc ggc ctg ctc gaa				1728
Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu	565	570	575	
ctc gaa tac gag ggc ttc tac aag cgc ggc ttc ttc gtg acg aag aag				1776
Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys	580	585	590	
aag tac gcg gtt ata gac gag gag gac aag ata acg acg cgc ggg ctt				1824
Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu	595	600	605	
gaa ata gtt agg cgt gac tgg agc gag ata gcg aag gag acg cag gcg				1872
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala	610	615	620	
agg gtt ctt gag gcg ata cta aag cac ggt gac gtt gaa gaa gcg gta				1920
Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val	625	630	635	640
agg att gtc aaa gag gtt acg gag aag ctg agc aag tac gag gtt cca				1968
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro	645	650	655	
ccg gag aag ctg gtc atc tac gag cag ata acc cgc gac ctg aag gac				2016
Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp	660	665	670	
tac aag gcc acc ggg ccg cat gtg gct gtt gca aaa cgc ctc gcc gca				2064
Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala	675	680	685	
agg ggg ata aaa atc cgg ccc gga acg gtc ata agc tac atc gtg ctc				2112
Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu	690	695	700	
aaa ggc tcg gga agg att ggg gac agg gct ata ccc ttt gac gaa ttt				2160
Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe	705	710	715	720
gac ccg gca aag cac aag tac gat gca gaa tac tac atc gag aac cag				2208
Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln	725	730	735	
gtt ctt cca gct gtg gag agg att ctg agg gcc ttt ggt tac cgt aaa				2256
Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys	740	745	750	
gaa gat tta agg tat cag aaa acg cgg cag gtt ggc ttg ggg gcg tgg				2304
Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp	755	760	765	
cta aaa cct aag aca tga				2322
Leu Lys Pro Lys Thr	770			

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<210> 58
<211> 773
<212> PRT
<213> Thermococcus gorgonarius

<220>
<221> misc_feature
<222> (93)..(93)
<223> The 'Xaa' at location 93 stands for Lys, Asn, Arg, Ser, Thr, Ile,
      Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys,
      or Phe.

<400> 58

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1      5      10      15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
      20      25      30

Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
      35      40      45

Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
      50      55      60

Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65      70      75      80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile
      85      90      95

Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
      100     105     110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
      115     120     125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
      130     135     140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145     150     155     160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
      165     170     175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
      180     185     190

Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
      195     200     205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
      210     215     220

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Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
 225 230 235 240
 Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
 245 250 255
 His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
 260 265 270
 Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
 275 280 285
 Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
 290 295 300
 Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
 305 310 315 320
 Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
 355 360 365
 Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
 370 375 380
 Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
 385 390 395 400
 Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
 405 410 415
 Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
 420 425 430
 Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
 435 440 445
 Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
 450 455 460
 Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
 465 470 475 480
 Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
 485 490 495
 Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
 500 505 510
 Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
 515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
 530 535 540
 Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560
 Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
 565 570 575
 Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590
 Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
 595 600 605
 Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
 625 630 635 640
 Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
 755 760 765
 Leu Lys Pro Lys Thr
 770

<210> 59
 <211> 2322
 <212> DNA
 <213> Thermococcus gorgonarius

<220>
 <221> CDS
 <222> (1) .. (2322)
 <223>

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<220>
<221> misc_feature
<222> (277)..(279)
<223> NNN = GAA, GAG

<400> 59
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Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1          5          10          15

agg atc ttc aag aag gag aac ggc gag ttc aaa ata gac tac gac aga      96
Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
          20          25          30

aac ttt gag cca tac atc tac gcg ctc ttg aag gac gac tct gcg att      144
Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
          35          40          45

gag gac gtc aag aag ata act gcc gag agg cac ggc act acc gtt agg      192
Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
          50          55          60

gtt gtc agg gcc gag aaa gtg aag aag aag ttc cta ggc agg ccg ata      240
Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65          70          75          80

gag gtc tgg aag ctc tac ttc act cac ccc cag gac nnn ccc gca atc      288
Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile
          85          90          95

agg gac aag ata aag gag cat cct gcc gtt gtg gac atc tac gag tac      336
Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
          100          105          110

gac atc ccc ttc gcg aag cgc tac ctc ata gac aaa ggc tta atc ccg      384
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
          115          120          125

atg gag ggc gac gag gaa ctt aag atg ctc gcc ttc gac atc gag acg      432
Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
          130          135          140

ctc tat cac gag ggc gag gag ttc gcc gaa ggg cct atc ctg atg ata      480
Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145          150          155          160

agc tac gcc gac gag gaa ggg gcg cgc gtt att acc tgg aag aat atc      528
Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
          165          170          175

gac ctt ccc tat gtc gac gtc gtt tcc acc gag aag gag atg ata aag      576
Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
          180          185          190

cgc ttc ctc aag gtc gtc aag gaa aag gat ccc gac gtc ctc ata acc      624
Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr

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195	200	205	
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aag ctc gga gtc aag ttc atc ctc gga agg gaa ggg agc gag ccg aaa Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys 225 230 235 240			720
atc cag cgc atg ggc gat cgc ttt gcg gtg gag gtc aag gga agg att Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile 245 250 255			768
cac ttc gac ctc tac ccc gtc att agg aga acg att aac ctc ccc act His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr 260 265 270			816
tac acc ctt gag gca gta tat gaa gcc atc ttt gga cag ccg aag gag Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu 275 280 285			864
aag gtc tac gct gag gag ata gcg cag gcc tgg gaa acg ggc gag gga Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly 290 295 300			912
tta gaa agg gtg gcc cgc tac tcg atg gag gac gca aag gta acc tat Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr 305 310 315 320			960
gaa ctc gga aaa gag ttc ttc cct atg gaa gcc cag ctc tcg cgc ctc Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu 325 330 335			1008
gta ggc cag agc ctc tgg gat gta tct cgc tcg agt acc gga aac ctc Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu 340 345 350			1056
gtc gag tgg ttt ttg ctg agg aag gcc tac gag agg aat gaa ctt gca Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala 355 360 365			1104
cca aac aag ccg gac gag agg gag ctg gca aga aga agg gag agc tac Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr 370 375 380			1152
gcg ggt gga tac gtc aag gag ccc gaa agg gga ctg tgg gag aac atc Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile 385 390 395 400			1200
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aac gtc tcc cct gat aca ctc aac agg gag ggt tgt gag gag tac gac Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp 420 425 430			1296

gtg gct cct cag gta ggc cat aag ttc tgc aag gac ttc ccc ggc ttc	1344
Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe	
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Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys	
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aag aag atg aag gcc act ata gac cca atc gag aag aaa ctc ctc gat	1440
Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp	
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tac agg caa cga gca atc aaa atc ctt gct aat agc ttc tac ggt tac	1488
Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr	
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tac ggc tat gca aag gcc cgc tgg tac tgc aag gag tgc gcc gag agc	1536
Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser	
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Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile	
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gag gag aaa ttt ggc ttt aaa gtc ctc tac gcg gac aca gat gga ttt	1632
Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe	
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Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala	
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Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu	
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Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys	
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Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu	
595 600 605	
gaa ata gtt agg cgt gac tgg agc gag ata gcg aag gag acg cag gcg	1872
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala	
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agg gtt ctt gag gcg ata cta aag cac ggt gac gtt gaa gaa gcg gta	1920
Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val	
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agg att gtc aaa gag gtt acg gag aag ctg agc aag tac gag gtt cca	1968
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro	
645 650 655	

ccg gag aag ctg gtc atc tac gag cag ata acc cgc gac ctg aag gac Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp 660 665 670	2016
tac aag gcc acc ggg ccg cat gtg gct gtt gca aaa cgc ctc gcc gca Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala 675 680 685	2064
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gac ccg gca aag cac aag tac gat gca gaa tac tac atc gag aac cag Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln 725 730 735	2208
gtt ctt cca gct gtg gag agg att ctg agg gcc ttt ggt tac cgt aaa Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys 740 745 750	2256
gaa gat tta agg tat cag aaa acg cgg cag gtt ggc ttg ggg gcg tgg Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp 755 760 765	2304
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Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile 35 40 45	
Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg 50 55 60	

Val	Val	Arg	Ala	Glu	Lys	Val	Lys	Lys	Lys	Phe	Leu	Gly	Arg	Pro	Ile	
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Glu	Val	Trp	Lys	Leu	Tyr	Phe	Thr	His	Pro	Gln	Asp	Xaa	Pro	Ala	Ile	
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Arg	Asp	Lys	Ile	Lys	Glu	His	Pro	Ala	Val	Val	Asp	Ile	Tyr	Glu	Tyr	
			100					105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
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Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Met	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
	130					135					140					
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Glu	Gly	Pro	Ile	Leu	Met	Ile	
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Ser	Tyr	Ala	Asp	Glu	Glu	Gly	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Ile	
				165					170					175		
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys	
			180					185					190			
Arg	Phe	Leu	Lys	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr	
		195					200					205				
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Ser	Glu	
	210					215					220					
Lys	Leu	Gly	Val	Lys	Phe	Ile	Leu	Gly	Arg	Glu	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile	
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His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	
			260					265					270			
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Gln	Pro	Lys	Glu	
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Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Gln	Ala	Trp	Glu	Thr	Gly	Glu	Gly	
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Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	
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Val	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
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Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	
		355					360					365				

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
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 Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
 385 390 395 400
 Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
 405 410 415
 Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
 420 425 430
 Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
 435 440 445
 Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
 450 455 460
 Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
 465 470 475 480
 Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
 485 490 495
 Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
 500 505 510
 Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
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 Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
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 Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560
 Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
 565 570 575
 Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590
 Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
 595 600 605
 Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
 625 630 635 640
 Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
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 Leu Lys Pro Lys Thr
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 gttttataact ccaaactgag ttagtagata tgtgggggagc ata atg att tta gat 235
 Met Ile Leu Asp
 1
 gtg gat tac ata act gaa gaa gga aaa cct gtt att agg cta ttc aaa 283
 Val Asp Tyr Ile Thr Glu Gly Lys Pro Val Ile Arg Leu Phe Lys
 5 10 15 20
 aaa gag aac gga aaa ttt aag ata gag cat gat aga act ttt aga cca 331
 Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg Thr Phe Arg Pro
 25 30 35
 tac att tac gct ctt ctc agg gat gat tca aag att gaa gaa gtt aag 379

Tyr	Ile	Tyr	Ala	Leu	Leu	Arg	Asp	Asp	Ser	Lys	Ile	Glu	Glu	Val	Lys	
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Lys	Ile	Thr	Gly	Glu	Arg	His	Gly	Lys	Ile	Val	Arg	Ile	Val	Asp	Val	
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gag	aag	ggt	gag	aaa	aag	ttt	ctc	ggc	aag	cct	att	acc	gtg	tgg	aaa	475
Glu	Lys	Val	Glu	Lys	Lys	Phe	Leu	Gly	Lys	Pro	Ile	Thr	Val	Trp	Lys	
	70					75					80					
ctt	tat	ttg	gaa	cat	ccc	caa	gat	ggt	ccc	act	att	aga	gaa	aaa	ggt	523
Leu	Tyr	Leu	Glu	His	Pro	Gln	Asp	Val	Pro	Thr	Ile	Arg	Glu	Lys	Val	
85					90					95					100	
aga	gaa	cat	cca	gca	ggt	gtg	gac	atc	ttc	gaa	tac	gat	att	cca	ttt	571
Arg	Glu	His	Pro	Ala	Val	Val	Asp	Ile	Phe	Glu	Tyr	Asp	Ile	Pro	Phe	
			105						110					115		
gca	aag	aga	tac	ctc	atc	gac	aaa	ggc	cta	ata	cca	atg	gag	ggg	gaa	619
Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	Met	Glu	Gly	Glu	
			120					125					130			
gaa	gag	cta	aag	att	ctt	gcc	ttc	gat	ata	gaa	acc	ctc	tat	cac	gaa	667
Glu	Glu	Leu	Lys	Ile	Leu	Ala	Phe	Asp	Ile	Glu	Thr	Leu	Tyr	His	Glu	
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gga	gaa	gag	ttt	gga	aaa	ggc	cca	att	ata	atg	att	agt	tat	gca	gat	715
Gly	Glu	Glu	Phe	Gly	Lys	Gly	Pro	Ile	Ile	Met	Ile	Ser	Tyr	Ala	Asp	
	150					155					160					
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Glu	Asn	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Asn	Ile	Asp	Leu	Pro	Tyr	
165					170					175					180	
ggt	gag	ggt	gta	tca	agc	gag	aga	gag	atg	ata	aag	aga	ttt	ctc	agg	811
Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys	Arg	Phe	Leu	Arg	
				185					190					195		
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Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr	Tyr	Asn	Gly	Asp	
			200					205					210			
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Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu	Lys	Leu	Gly	Ile	
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Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	Met	Gln	Arg	Ile	
	230					235					240					
ggc	gat	atg	acg	gct	gta	gaa	gtc	aag	gga	aga	ata	cat	ttc	gac	ttg	1003
Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile	His	Phe	Asp	Leu	
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tat	cat	gta	ata	aca	agg	aca	ata	aat	ctc	cca	aca	tac	aca	cta	gag	1051
Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr	Tyr	Thr	Leu	Glu	

265										270					275					
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Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn	Leu	Glu	Arg	Val					
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gcc	aaa	tac	tcg	atg	gaa	gat	gca	aag	gca	act	tat	gaa	ctc	ggg	aaa	1195				
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gaa	ttc	ctt	cca	atg	gaa	att	cag	ctt	tca	aga	tta	gtt	gga	caa	cct	1243				
Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu	Val	Gly	Gln	Pro					
325						330						335			340					
tta	tgg	gat	gtt	tca	agg	tca	agc	aca	ggg	aac	ctt	gta	gag	tgg	ttc	1291				
Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	Val	Glu	Trp	Phe					
			345						350			355								
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Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala	Pro	Asn	Lys	Pro					
			360						365			370								
agt	gaa	gag	gag	tat	caa	aga	agg	ctc	agg	gag	agc	tac	aca	ggt	gga	1387				
Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser	Tyr	Thr	Gly	Gly					
			375						380			385								
ttc	gtt	aaa	gag	cca	gaa	aag	ggg	ttg	tgg	gaa	aac	ata	gta	tac	cta	1435				
Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn	Ile	Val	Tyr	Leu					
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Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr	Asp	Ile	Ala	Pro					
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Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly	Phe	Ile	Pro	Ser					
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			455						460			465								
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470						475						480								
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485						490						495			500					

gca aaa gca aga tgg tac tgt aag gag tgt gct gag agc gtt act gcc	1771
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Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu Leu Glu Glu Lys	
520 525 530	
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Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly Leu Tyr Ala Thr	
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Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys Ala Leu Glu Phe	
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Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu Glu Leu Glu Tyr	
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gaa ggg ttt tat aag agg gga ttc ttc gtt acg aag aag agg tat gca	2011
Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys Arg Tyr Ala	
585 590 595	
gta ata gat gaa gaa gga aaa gtc att act cgt ggt tta gag ata gtt	2059
Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly Leu Glu Ile Val	
600 605 610	
agg aga gat tgg agt gaa att gca aaa gaa act caa gct aga gtt ttg	2107
Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala Arg Val Leu	
615 620 625	
gag aca ata cta aaa cac gga gat gtt gaa gaa gct gtg aga ata gta	2155
Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala Val Arg Ile Val	
630 635 640	
aaa gaa gta ata caa aag ctt gcc aat tat gaa att cca cca gag aag	2203
Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile Pro Pro Glu Lys	
645 650 655 660	
ctc gca ata tat gag cag ata aca aga cca tta cat gag tat aag gcg	2251
Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His Glu Tyr Lys Ala	
665 670 675	
ata ggt cct cac gta gct gtt gca aag aaa cta gct gct aaa gga gtt	2299
Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala Ala Lys Gly Val	
680 685 690	
aaa ata aag cca gga atg gta att gga tac ata gta ctt aga ggc gat	2347
Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val Leu Arg Gly Asp	
695 700 705	
ggt cca att agc aat agg gca att cta gct gag gaa tac gat ccc aaa	2395
Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu Tyr Asp Pro Lys	
710 715 720	

aag cac aag tat gac gca gaa tat tac att gag aac cag gtt ctt cca 2443
Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln Val Leu Pro
725 730 735 740

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aga tac caa aag aca aga caa gtc ggc cta act tcc tgg ctt aac att      2539
Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser Trp Leu Asn Ile
              760                      765                      770

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tctatgaaag aagaactgag caggaattac cagttcttcc gttattttat gggtaattaa 2651

aatagaataa acaacatcac tcacttcaaa cgccttcggtt agaaatgggtc tatctgcatg 2771

gaaacatcag aaactttgac ttctacaaca tttctaactt tgcaactctt caagattttc 2891

cagagccgct ccaatggata acacccctgt tcccgcaccc aagtccgcta caattttttc 3011

ttgtattgct ctagccaagg tttgggattt ttgaatcctt taactctgga aagtataatt 3131

gaaataactg tctcaaatta tgacaactct tgacattttt acttcattac cagggtaatg 3251

tggttgctgct ccatatgata agcttccaaa gtgggtgttc agacttttag aactcaaat 3371

actactcaga tgcttcccca ggaatgaggt tgttgtagct cntcccnгаа agattqaaat 3491

<210> 62

<212> PRT

<213> Pyrococcus furiosus

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Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
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 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
 85 90 95
 Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
 145 150 155 160
 Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
 165 170 175
 Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
 180 185 190
 Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr
 195 200 205
 Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu
 210 215 220
 Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys
 225 230 235 240
 Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
 245 250 255
 His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
 260 265 270
 Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
 275 280 285
 Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
 290 295 300
 Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
 305 310 315 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
 355 360 365
 Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
 370 375 380
 Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
 385 390 395 400
 Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
 405 410 415
 His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
 420 425 430
 Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
 435 440 445
 Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
 450 455 460
 Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
 465 470 475 480
 Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
 485 490 495
 Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
 500 505 510
 Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
 565 570 575
 Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
 580 585 590
 Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
755 760 765

Trp Leu Asn Ile Lys Lys Ser
770 775

<210> 63
<211> 207
<212> DNA
<213> *Pyrococcus furiosus*

<220>
<221> CDS
<222> (1)..(207)
<223>

<400> 63
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Met Met Gly Glu Leu Pro Ile Ala Pro Val Asp Arg Leu Ile Arg Lys
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gct ggt gct cag aga gtt agc gag caa gca gct aag gta ctt gca gag 96
Ala Gly Ala Gln Arg Val Ser Glu Gln Ala Ala Lys Val Leu Ala Glu
20 25 30

cac ctt gag gaa aaa gct att gag atc gca aaa aag gca gta gat ctt 144
His Leu Glu Glu Lys Ala Ile Glu Ile Ala Lys Lys Ala Val Asp Leu
35 40 45

gca aag cac gca ggt aga aag acc gtt aag gtc gaa gac att aag ctc 192
Ala Lys His Ala Gly Arg Lys Thr Val Lys Val Glu Asp Ile Lys Leu
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gca att aag agc tga
 Ala Ile Lys Ser
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207

<210> 64
 <211> 68
 <212> PRT
 <213> Pyrococcus furiosus

<400> 64

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Ala	Gly	Ala	Gln	Arg	Val	Ser	Glu	Gln	Ala	Ala	Lys	Val	Leu	Ala	Glu
			20					25					30		
His	Leu	Glu	Glu	Lys	Ala	Ile	Glu	Ile	Ala	Lys	Lys	Ala	Val	Asp	Leu
		35					40					45			
Ala	Lys	His	Ala	Gly	Arg	Lys	Thr	Val	Lys	Val	Glu	Asp	Ile	Lys	Leu
	50					55					60				

Ala Ile Lys Ser
 65

<210> 65
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 <212> DNA
 <213> Thermus aquaticus

<220>
 <221> CDS
 <222> (1) .. (2556)
 <223>

<400> 65

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Gly	Gly	Gly	Val	Thr	Ser	Gly	Met	Leu	Pro	Leu	Phe	Glu	Pro	Lys	Gly	
1				5					10					15		
cgg	gtc	ctc	ctg	gtg	gac	ggc	cac	cac	ctg	gcc	tac	cgc	acc	ttc	cac	96
Arg	Val	Leu	Leu	Val	Asp	Gly	His	His	Leu	Ala	Tyr	Arg	Thr	Phe	His	
			20					25					30			
gcc	ctg	aag	ggc	ctc	acc	acc	agc	cgg	ggg	gag	ccg	gtg	cag	gcg	gtc	144
Ala	Leu	Lys	Gly	Leu	Thr	Thr	Ser	Arg	Gly	Glu	Pro	Val	Gln	Ala	Val	
		35					40					45				
tac	ggc	ttc	gcc	aag	agc	ctc	ctc	aag	gcc	ctc	aag	gag	gac	ggg	gac	192
Tyr	Gly	Phe	Ala	Lys	Ser	Leu	Leu	Lys	Ala	Leu	Lys	Glu	Asp	Gly	Asp	
	50					55					60					
gcg	gtg	atc	gtg	gtc	ttt	gac	gcc	aag	gcc	ccc	tcc	ttc	cgc	cac	gag	240
Ala	Val	Ile	Val	Val	Phe	Asp	Ala	Lys	Ala	Pro	Ser	Phe	Arg	His	Glu	
65					70					75					80	

gcc tac ggg ggg tac aag gcg ggc cgg gcc ccc acg cca gag gac ttt Ala Tyr Gly Gly Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe 85 90 95	288
ccc cgg caa ctc gcc ctc atc aag gag ctg gtg gac ctc ctg ggg ctg Pro Arg Gln Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu 100 105 110	336
gcg cgc ctc gag gtc ccg ggc tac gag gcg gac gac gtc ctg gcc agc Ala Arg Leu Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser 115 120 125	384
ctg gcc aag aag gcg gaa aag gag ggc tac gag gtc cgc atc ctc acc Leu Ala Lys Lys Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr 130 135 140	432
gcc gac aaa gac ctt tac cag ctc ctt tcc gac cgc atc cac gtc ctc Ala Asp Lys Asp Leu Tyr Gln Leu Leu Ser Asp Arg Ile His Val Leu 145 150 155 160	480
cac ccc gag ggg tac ctc atc acc ccg gcc tgg ctt tgg gaa aag tac His Pro Glu Gly Tyr Leu Ile Thr Pro Ala Trp Leu Trp Glu Lys Tyr 165 170 175	528
ggc ctg agg ccc gac cag tgg gcc gac tac cgg gcc ctg acc ggg gac Gly Leu Arg Pro Asp Gln Trp Ala Asp Tyr Arg Ala Leu Thr Gly Asp 180 185 190	576
gag tcc gac aac ctt ccc ggg gtc aag ggc atc ggg gag aag acg gcg Glu Ser Asp Asn Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala 195 200 205	624
agg aag ctt ctg gag gag tgg ggg agc ctg gaa gcc ctc ctc aag aac Arg Lys Leu Leu Glu Glu Trp Gly Ser Leu Glu Ala Leu Leu Lys Asn 210 215 220	672
ctg gac cgg ctg aag ccc gcc atc cgg gag aag atc ctg gcc cac atg Leu Asp Arg Leu Lys Pro Ala Ile Arg Glu Lys Ile Leu Ala His Met 225 230 235 240	720
gac gat ctg aag ctc tcc tgg gac ctg gcc aag gtg cgc acc gac ctg Asp Asp Leu Lys Leu Ser Trp Asp Leu Ala Lys Val Arg Thr Asp Leu 245 250 255	768
ccc ctg gag gtg gac ttc gcc aaa agg cgg gag ccc gac cgg gag agg Pro Leu Glu Val Asp Phe Ala Lys Arg Arg Glu Pro Asp Arg Glu Arg 260 265 270	816
ctt agg gcc ttt ctg gag agg ctt gag ttt ggc agc ctc ctc cac gag Leu Arg Ala Phe Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu 275 280 285	864
ttc ggc ctt ctg gaa agc ccc aag gcc ctg gag gag gcc ccc tgg ccc Phe Gly Leu Leu Glu Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro 290 295 300	912

ccg ccg gaa ggg gcc ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc	960
Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro	
305 310 315 320	
atg tgg gcc gat ctt ctg gcc ctg gcc gcc agg ggg ggc cgg gtc	1008
Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Arg Gly Gly Arg Val	
325 330 335	
cac cgg gcc ccc gag cct tat aaa gcc ctc agg gac ctg aag gag gcg	1056
His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala	
340 345 350	
cgg ggg ctt ctc gcc aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc	1104
Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly	
355 360 365	
ctt ggc ctc ccg ccc ggc gac gac ccc atg ctc ctc gcc tac ctc ctg	1152
Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu	
370 375 380	
gac cct tcc aac acc acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg	1200
Asp Pro Ser Asn Thr Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly	
385 390 395 400	
gag tgg acg gag gag gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc	1248
Glu Trp Thr Glu Glu Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu	
405 410 415	
ttc gcc aac ctg tgg ggg agg ctt gag ggg gag gag agg ctc ctt tgg	1296
Phe Ala Asn Leu Trp Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp	
420 425 430	
ctt tac cgg gag gtg gag agg ccc ctt tcc gct gtc ctg gcc cac atg	1344
Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala Val Leu Ala His Met	
435 440 445	
gag gcc acg ggg gtg cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc	1392
Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser	
450 455 460	
ctg gag gtg gcc gag gag atc gcc cgc ctc gag gcc gag gtc ttc cgc	1440
Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg	
465 470 475 480	
ctg gcc ggc cac ccc ttc aac ctc aac tcc cgg gac cag ctg gaa agg	1488
Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg	
485 490 495	
gtc ctc ttt gac gag cta ggg ctt ccc gcc atc ggc aag acg gag aag	1536
Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys	
500 505 510	
acc ggc aag cgc tcc acc agc gcc gcc gtc ctg gag gcc ctc cgc gag	1584
Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu	
515 520 525	
gcc cac ccc atc gtg gag aag atc ctg cag tac cgg gag ctc acc aag	1632

Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	
530						535					540					
ctg	aag	agc	acc	tac	att	gac	ccc	ttg	ccg	gac	ctc	atc	cac	ccc	agg	1680
Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	
545					550					555					560	
acg	ggc	cgc	ctc	cac	acc	cgc	ttc	aac	cag	acg	gcc	acg	gcc	acg	ggc	1728
Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
				565					570					575		
agg	cta	agt	agc	tcc	gat	ccc	aac	ctc	cag	aac	atc	ccc	gtc	cgc	acc	1776
Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
			580					585					590			
ccg	ctt	ggg	cag	agg	atc	cgc	cgg	gcc	ttc	atc	gcc	gag	gag	ggg	tgg	1824
Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	
		595					600					605				
cta	ttg	gtg	gcc	ctg	gac	tat	agc	cag	ata	gag	ctc	agg	gtg	ctg	gcc	1872
Leu	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
	610					615					620					
cac	ctc	tcc	ggc	gac	gag	aac	ctg	atc	cgg	gtc	ttc	cag	gag	ggg	cgg	1920
His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	
625					630					635					640	
gac	atc	cac	acg	gag	acc	gcc	agc	tgg	atg	ttc	ggc	gtc	ccc	cgg	gag	1968
Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Arg	Glu	
				645					650					655		
gcc	gtg	gac	ccc	ctg	atg	cgc	cgg	gcg	gcc	aag	acc	atc	aac	ttc	ggg	2016
Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	
			660					665					670			
gtc	ctc	tac	ggc	atg	tcg	gcc	cac	cgc	ctc	tcc	cag	gag	cta	gcc	atc	2064
Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	
		675					680					685				
cct	tac	gag	gag	gcc	cag	gcc	ttc	att	gag	cgc	tac	ttt	cag	agc	ttc	2112
Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	
	690					695					700					
ccc	aag	gtg	cgg	gcc	tgg	att	gag	aag	acc	ctg	gag	gag	ggc	agg	agg	2160
Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	
705					710					715					720	
cgg	ggg	tac	gtg	gag	acc	ctc	ttc	ggc	cgc	cgc	cgc	tac	gtg	cca	gac	2208
Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	
				725					730					735		
cta	gag	gcc	cgg	gtg	aag	agc	gtg	cgg	gag	gcg	gcc	gag	cgc	atg	gcc	2256
Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	
			740					745					750			
ttc	aac	atg	ccc	gtc	cag	ggc	acc	gcc	gcc	gac	ctc	atg	aag	ctg	gct	2304
Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	

755	760	765	
atg gtg aag ctc ttc ccc agg ctg gag gaa atg ggg gcc agg atg ctc			2352
Met Val Lys Leu Phe Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu			
770	775	780	
ctt cag gtc cac gac gag ctg gtc ctc gag gcc cca aaa gag agg gcg			2400
Leu Gln Val His Asp Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala			
785	790	795	800
gag gcc gtg gcc cgg ctg gcc aag gag gtc atg gag ggg gtg tat ccc			2448
Glu Ala Val Ala Arg Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro			
	805	810	815
ctg gcc gtg ccc ctg gag gtg gag gtg ggg ata ggg gag gac tgg ctc			2496
Leu Ala Val Pro Leu Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu			
	820	825	830
tcc gcc aag gag ggc att gat ggc cgc ggc gga ggc ggg cat cat cat			2544
Ser Ala Lys Glu Gly Ile Asp Gly Arg Gly Gly Gly Gly His His His			
	835	840	845
cat cat cat taa			2556
His His His			
850			
<210> 66			
<211> 851			
<212> PRT			
<213> Thermus aquaticus			
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Arg Val Leu Leu Val Asp Gly His His Leu Ala Tyr Arg Thr Phe His			
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Ala Leu Lys Gly Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val			
	35	40	45
Tyr Gly Phe Ala Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Asp			
	50	55	60
Ala Val Ile Val Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu			
	65	70	75
			80
Ala Tyr Gly Gly Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe			
	85	90	95
Pro Arg Gln Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu			
	100	105	110
Ala Arg Leu Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser			
	115	120	125

Leu Ala Lys Lys Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr
 130 135 140
 Ala Asp Lys Asp Leu Tyr Gln Leu Leu Ser Asp Arg Ile His Val Leu
 145 150 155 160
 His Pro Glu Gly Tyr Leu Ile Thr Pro Ala Trp Leu Trp Glu Lys Tyr
 165 170 175
 Gly Leu Arg Pro Asp Gln Trp Ala Asp Tyr Arg Ala Leu Thr Gly Asp
 180 185 190
 Glu Ser Asp Asn Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala
 195 200 205
 Arg Lys Leu Leu Glu Glu Trp Gly Ser Leu Glu Ala Leu Leu Lys Asn
 210 215 220
 Leu Asp Arg Leu Lys Pro Ala Ile Arg Glu Lys Ile Leu Ala His Met
 225 230 235 240
 Asp Asp Leu Lys Leu Ser Trp Asp Leu Ala Lys Val Arg Thr Asp Leu
 245 250 255
 Pro Leu Glu Val Asp Phe Ala Lys Arg Arg Glu Pro Asp Arg Glu Arg
 260 265 270
 Leu Arg Ala Phe Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu
 275 280 285
 Phe Gly Leu Leu Glu Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro
 290 295 300
 Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro
 305 310 315 320
 Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Arg Gly Gly Arg Val
 325 330 335
 His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala
 340 345 350
 Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly
 355 360 365
 Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu
 370 375 380
 Asp Pro Ser Asn Thr Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly
 385 390 395 400
 Glu Trp Thr Glu Glu Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu
 405 410 415
 Phe Ala Asn Leu Trp Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp
 420 425 430

Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala Val Leu Ala His Met
 435 440 445
 Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser
 450 455 460
 Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg
 465 470 475 480
 Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg
 485 490 495
 Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys
 500 505 510
 Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu
 515 520 525
 Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys
 530 535 540
 Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg
 545 550 555 560
 Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly
 565 570 575
 Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr
 580 585 590
 Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp
 595 600 605
 Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala
 610 615 620
 His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg
 625 630 635 640
 Asp Ile His Thr Glu Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu
 645 650 655
 Ala Val Asp Pro Leu Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly
 660 665 670
 Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile
 675 680 685
 Pro Tyr Glu Glu Ala Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe
 690 695 700
 Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg
 705 710 715 720
 Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp

725					730					735					
Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala
			740					745					750		
Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala
		755					760					765			
Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Glu	Glu	Met	Gly	Ala	Arg	Met	Leu
		770					775					780			
Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu	Glu	Ala	Pro	Lys	Glu	Arg	Ala
785							790					795			800
Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu	Val	Met	Glu	Gly	Val	Tyr	Pro
				805					810						
Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Ile	Gly	Glu	Asp	Trp	Leu
			820					825					830		
Ser	Ala	Lys	Glu	Gly	Ile	Asp	Gly	Arg	Gly	Gly	Gly	Gly	His	His	His
		835					840					845			
His	His	His													
		850													

<210> 67
 <211> 750
 <212> DNA
 <213> *Pyrococcus furiosus*

<220>
 <221> CDS
 <222> (1)..(750)
 <223>

<400> 67	
atg cca ttt gaa atc gta ttt gaa ggt gca aaa gag ttt gcc caa ctt	48
Met Pro Phe Glu Ile Val Phe Glu Gly Ala Lys Glu Phe Ala Gln Leu	
1 5 10 15	
ata gac acc gca agt aag tta ata gat gag gcc gcg ttt aaa gtt aca	96
Ile Asp Thr Ala Ser Lys Leu Ile Asp Glu Ala Ala Phe Lys Val Thr	
20 25 30	
gaa gat ggg ata agc atg agg gcc atg gat cca agt aga gtt gtc ctg	144
Glu Asp Gly Ile Ser Met Arg Ala Met Asp Pro Ser Arg Val Val Leu	
35 40 45	
att gac cta aat ctc ccg tca agc ata ttt agc aaa tat gaa gtt gtt	192
Ile Asp Leu Asn Leu Pro Ser Ser Ile Phe Ser Lys Tyr Glu Val Val	
50 55 60	
gaa cca gaa aca att gga gtt aac atg gac cac cta aag aag atc cta	240
Glu Pro Glu Thr Ile Gly Val Asn Met Asp His Leu Lys Lys Ile Leu	
65 70 75 80	

aag aga ggt aaa gca aag gac acc tta ata ctc aag aaa gga gag gaa Lys Arg Gly Lys Ala Lys Asp Thr Leu Ile Leu Lys Lys Gly Glu Glu 85 90 95	288
aac ttc tta gag ata aca att caa gga act gca aca aga aca ttt aga Asn Phe Leu Glu Ile Thr Ile Gln Gly Thr Ala Thr Arg Thr Phe Arg 100 105 110	336
gtt ccc cta ata gat gta gaa gag atg gaa gtt gac ctc cca gaa ctt Val Pro Leu Ile Asp Val Glu Glu Met Glu Val Asp Leu Pro Glu Leu 115 120 125	384
cca ttc act gca aag gtt gta gtt ctt gga gaa gtc cta aaa gat gct Pro Phe Thr Ala Lys Val Val Val Leu Gly Glu Val Leu Lys Asp Ala 130 135 140	432
gtt aaa gat gcc tct cta gtg agt gac agc ata aaa ttt att gcc agg Val Lys Asp Ala Ser Leu Val Ser Asp Ser Ile Lys Phe Ile Ala Arg 145 150 155 160	480
gaa aat gaa ttt ata atg aag gca gag gga gaa acc cag gaa gtt gag Glu Asn Glu Phe Ile Met Lys Ala Glu Gly Glu Thr Gln Glu Val Glu 165 170 175	528
ata aag cta act ctt gaa gat gag gga tta ttg gac atc gag gtt caa Ile Lys Leu Thr Leu Glu Asp Glu Gly Leu Leu Asp Ile Glu Val Gln 180 185 190	576
gag gag aca aag agc gca tat gga gtc agc tat ctc tcc gac atg gtt Glu Glu Thr Lys Ser Ala Tyr Gly Val Ser Tyr Leu Ser Asp Met Val 195 200 205	624
aaa gga ctt gga aag gcc gat gaa gtt aca ata aag ttt gga aat gaa Lys Gly Leu Gly Lys Ala Asp Glu Val Thr Ile Lys Phe Gly Asn Glu 210 215 220	672
atg ccc atg caa atg gag tat tac att aga gat gaa gga aga ctt aca Met Pro Met Gln Met Glu Tyr Tyr Ile Arg Asp Glu Gly Arg Leu Thr 225 230 235 240	720
ttc cta ctg gct cca aga gtt gaa gag tga Phe Leu Leu Ala Pro Arg Val Glu Glu 245	750
<210> 68	
<211> 249	
<212> PRT	
<213> <i>Pyrococcus furiosus</i>	
<400> 68	
Met Pro Phe Glu Ile Val Phe Glu Gly Ala Lys Glu Phe Ala Gln Leu 1 5 10 15	
Ile Asp Thr Ala Ser Lys Leu Ile Asp Glu Ala Ala Phe Lys Val Thr 20 25 30	

Glu Asp Gly Ile Ser Met Arg Ala Met Asp Pro Ser Arg Val Val Leu
 35 40 45
 Ile Asp Leu Asn Leu Pro Ser Ser Ile Phe Ser Lys Tyr Glu Val Val
 50 55 60
 Glu Pro Glu Thr Ile Gly Val Asn Met Asp His Leu Lys Lys Ile Leu
 65 70 75 80
 Lys Arg Gly Lys Ala Lys Asp Thr Leu Ile Leu Lys Lys Gly Glu Glu
 85 90 95
 Asn Phe Leu Glu Ile Thr Ile Gln Gly Thr Ala Thr Arg Thr Phe Arg
 100 105 110
 Val Pro Leu Ile Asp Val Glu Glu Met Glu Val Asp Leu Pro Glu Leu
 115 120 125
 Pro Phe Thr Ala Lys Val Val Val Leu Gly Glu Val Leu Lys Asp Ala
 130 135 140
 Val Lys Asp Ala Ser Leu Val Ser Asp Ser Ile Lys Phe Ile Ala Arg
 145 150 155 160
 Glu Asn Glu Phe Ile Met Lys Ala Glu Gly Glu Thr Gln Glu Val Glu
 165 170 175
 Ile Lys Leu Thr Leu Glu Asp Glu Gly Leu Leu Asp Ile Glu Val Gln
 180 185 190
 Glu Glu Thr Lys Ser Ala Tyr Gly Val Ser Tyr Leu Ser Asp Met Val
 195 200 205
 Lys Gly Leu Gly Lys Ala Asp Glu Val Thr Ile Lys Phe Gly Asn Glu
 210 215 220
 Met Pro Met Gln Met Glu Tyr Tyr Ile Arg Asp Glu Gly Arg Leu Thr
 225 230 235 240
 Phe Leu Leu Ala Pro Arg Val Glu Glu
 245

<210> 69
 <211> 201
 <212> DNA
 <213> Sulfolobus acidocaldarius

<220>
 <221> CDS
 <222> (1)..(201)
 <223>

<400> 69
 atg gtg aag gta aag ttc aag tat aag ggt gaa gag aaa gaa gta gac
 Met Val Lys Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp
 1 5 10 15

48

act tca aag ata aag aag gtt tgg aga gta ggc aaa atg gtg tcc ttt	96
Thr Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Val Ser Phe	
20 25 30	

acc tat gac gac aat ggt aag aca ggt aga gga gct gta agc gag aaa	144
Thr Tyr Asp Asp Asn Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys	
35 40 45	

gat gct cca aaa gaa tta tta gac atg tta gca aga gca gaa aga gag	192
Asp Ala Pro Lys Glu Leu Leu Asp Met Leu Ala Arg Ala Glu Arg Glu	
50 55 60	

aag aaa taa	201
Lys Lys	
65	

<210> 70
 <211> 66
 <212> PRT
 <213> Sulfolobus acidocaldarius

<400> 70

Met Val Lys Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp
1 5 10 15

Thr Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Val Ser Phe
20 25 30

Thr Tyr Asp Asp Asn Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
35 40 45

Asp Ala Pro Lys Glu Leu Leu Asp Met Leu Ala Arg Ala Glu Arg Glu
50 55 60

Lys Lys
65

<210> 71
 <211> 189
 <212> DNA
 <213> Sulfolobus solfataricus

<220>
 <221> CDS
 <222> (1)..(189)
 <223>

<400> 71

gca acc gta aag ttc aag tac aaa ggc gaa gaa aaa gag gta gac atc	48
Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile	
1 5 10 15	

tcc aag atc aag aaa gta tgg cgt gtg ggc aag atg atc tcc ttc acc	96
Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr	
20 25 30	

tac gac gag ggc ggt ggc aag acc ggc cgt ggt gcg gta agc gaa aag 144
Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
35 40 45

gac gcg ccg aag gag ctg ctg cag atg ctg gag aag cag aaa aag 189
Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
50 55 60

<210> 72
<211> 63
<212> PRT
<213> Sulfolobus solfataricus

<400> 72

Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile
1 5 10 15

Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr
20 25 30

Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
35 40 45

Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
50 55 60

<210> 73
<211> 57
<212> PRT
<213> Methanopyrus kandleri

<400> 73

Val Ala Leu Val Tyr Asp Ala Glu Phe Val Gly Ser Glu Arg Glu Phe
1 5 10 15

Glu Glu Glu Arg Glu Thr Phe Leu Lys Gly Val Lys Ala Tyr Asp Gly
20 25 30

Val Leu Ala Thr Arg Tyr Leu Met Glu Arg Ser Ser Ser Ala Lys Asn
35 40 45

Asp Glu Glu Leu Leu Glu Leu His Gln
50 55

<210> 74
<211> 29
<212> PRT
<213> Escherichia coli

<400> 74

Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp Ile Arg
1 5 10 15

Arg Ile Gly Ala Ile Lys Asp Gly Asp Glu Val Val Gly

20

25

<210> 75
 <211> 57
 <212> PRT
 <213> Methanopyrus kandleri

<400> 75

Val Pro Ile Asp Glu Lys Glu Glu Arg Ile Leu Glu Ile Leu Arg Glu
 1 5 10 15

Asn Pro Trp Thr Pro His Asp Glu Ile Ala Arg Arg Gly Gly Leu Ser
 20 25 30

Val Ser Glu Val Glu Gly Glu Lys Asp Pro Glu Ser Ser Gly Ile Tyr
 35 40 45

Ser Leu Trp Ser Arg Val Val Val Asn
 50 55

<210> 76
 <211> 40
 <212> PRT
 <213> Escherichia coli

<400> 76

Ile Asp Arg Ile Asp Arg Lys Ile Leu Asn Glu Leu Gln Lys Asp Gly
 1 5 10 15

Arg Arg Ile Ser Asn Glu Leu Ala Lys Arg Val Gly Leu Ser Val Ser
 20 25 30

Thr Val Arg Glu Arg Val Arg Arg
 35 40

<210> 77
 <211> 40
 <212> PRT
 <213> Methanopyrus kandleri

<400> 77

Leu Lys Leu Gln Asp Arg Tyr Gly Ile Arg Glu Asp Val Ala Leu Cys
 1 5 10 15

Leu Ala Arg Ala Phe Asp Gly Ser Ile Ser Met Ile Ala Thr Thr Pro
 20 25 30

Tyr Arg Thr Leu Lys Asp Val Cys
 35 40

<210> 78
 <211> 15
 <212> PRT
 <213> Methanopyrus kandleri

<400> 78

Pro Asp Leu Thr Leu Glu Glu Ala Lys Ser Val Asn Arg Thr Leu
1 5 10 15

<210> 79

<211> 30

<212> PRT

<213> Methanopyrus kandleri

<400> 79

Ala Thr Leu Ile Asp Glu His Gly Leu Ser Pro Ala Asp Ala Ala Asp
1 5 10 15

Glu Leu Ile Glu His Phe Glu Ser Ile Ala Gly Ile Leu Ala
20 25 30

<210> 80

<211> 11

<212> PRT

<213> Methanopyrus kandleri

<400> 80

Thr Asp Leu Glu Glu Ile Glu Arg Met Tyr Glu
1 5 10

<210> 81

<211> 15

<212> PRT

<213> Methanopyrus kandleri

<400> 81

Glu Gly Arg Leu Ser Glu Glu Ala Tyr Arg Ala Ala Val Glu Ile
1 5 10 15

<210> 82

<211> 57

<212> PRT

<213> Thermococcus kodakaraensis

<400> 82

Ala Glu Leu Thr Lys Lys Glu Gly Val Gly Arg Lys Thr Ala Glu Arg
1 5 10 15

Leu Leu Arg Ala Phe Gly Asn Pro Glu Arg Val Lys Gln Leu Ala Arg
20 25 30

Glu Phe Glu Ile Glu Lys Leu Ala Ser Val Glu Gly Val Gly Glu Arg
35 40 45

Val Leu Arg Ser Leu Val Pro Gly Tyr
50 55

<210> 83
 <211> 27
 <212> PRT
 <213> Methanopyrus kandleri

<400> 83

Ala Ser Leu Ile Ser Ile Arg Gly Ile Asp Arg Glu Arg Ala Glu Arg
 1 5 10 15

Leu Leu Lys Lys Tyr Gly Gly Tyr Ser Lys Val
 20 25

<210> 84
 <211> 10
 <212> PRT
 <213> Methanopyrus kandleri

<400> 84

Arg Glu Ala Gly Val Glu Glu Leu Arg Glu
 1 5 10

<210> 85
 <211> 13
 <212> PRT
 <213> Methanopyrus kandleri

<400> 85

Asp Gly Leu Thr Asp Ala Gln Ile Arg Glu Leu Lys Gly
 1 5 10

<210> 86
 <211> 27
 <212> PRT
 <213> Methanopyrus kandleri

<400> 86

Leu Lys Thr Leu Glu Ser Ile Val Gly Asp Leu Glu Lys Ala Asp Glu
 1 5 10 15

Leu Lys Arg Lys Tyr Gly Ser Ala Ser Ala Val
 20 25

<210> 87
 <211> 10
 <212> PRT
 <213> Methanopyrus kandleri

<400> 87

Arg Arg Leu Pro Val Glu Glu Leu Arg Glu
 1 5 10

<210> 88
 <211> 13
 <212> PRT
 <213> Methanopyrus kandleri

<400> 88

Leu Gly Phe Ser Asp Asp Glu Ile Ala Glu Ile Lys Gly
 1 5 10

<210> 89
 <211> 28
 <212> PRT
 <213> Methanopyrus kandleri

<400> 89

Ile Pro Lys Lys Leu Arg Glu Ala Phe Asp Leu Glu Thr Ala Ala Glu
 1 5 10 15

Leu Tyr Glu Arg Tyr Gly Ser Leu Lys Glu Ile Gly
 20 25

<210> 90
 <211> 10
 <212> PRT
 <213> Methanopyrus kandleri

<400> 90

Arg Arg Leu Ser Tyr Asp Asp Leu Leu Glu
 1 5 10

<210> 91
 <211> 15
 <212> PRT
 <213> Methanopyrus kandleri

<400> 91

Leu Gly Ala Thr Pro Lys Ala Ala Ala Glu Ile Lys Gly Pro Glu
 1 5 10 15

<210> 92
 <211> 28
 <212> PRT
 <213> Methanopyrus kandleri

<400> 92

Lys Phe Leu Leu Asn Ile Glu Gly Val Gly Pro Lys Leu Ala Glu Arg
 1 5 10 15

Ile Leu Glu Ala Val Asp Tyr Asp Leu Glu Arg Leu
 20 25

<210> 93

<211> 26
 <212> PRT
 <213> Methanopyrus kandleri

<400> 93

Ala	Ser	Leu	Asn	Pro	Glu	Glu	Leu	Ala	Glu	Val	Glu	Gly	Leu	Gly	Glu
1				5					10					15	
Glu	Leu	Ala	Glu	Arg	Val	Val	Tyr	Ala	Ala						
			20					25							

<210> 94
 <211> 40
 <212> PRT
 <213> Methanopyrus kandleri

<400> 94

Trp	Lys	Glu	Trp	Leu	Glu	Arg	Lys	Val	Gly	Glu	Gly	Arg	Ala	Arg	Arg
1				5					10					15	
Leu	Ile	Glu	Tyr	Phe	Gly	Ser	Ala	Gly	Glu	Val	Gly	Lys	Leu	Val	Glu
			20					25					30		
Asn	Ala	Glu	Val	Ser	Lys	Leu	Leu								
		35				40									

<210> 95
 <211> 15
 <212> PRT
 <213> Methanopyrus kandleri

<400> 95

Val	Pro	Gly	Ile	Gly	Asp	Glu	Ala	Val	Ala	Arg	Leu	Val	Pro	Gly
1				5					10					15

<210> 96
 <211> 28
 <212> PRT
 <213> Methanopyrus kandleri

<400> 96

Tyr	Lys	Thr	Leu	Arg	Asp	Ala	Gly	Leu	Thr	Pro	Ala	Glu	Ala	Glu	Arg
1				5					10					15	
Val	Leu	Lys	Arg	Tyr	Gly	Ser	Val	Ser	Lys	Val	Gln				
			20					25							

<210> 97
 <211> 10
 <212> PRT
 <213> Methanopyrus kandleri

<400> 97

Glu Gly Ala Thr Pro Asp Glu Leu Arg Glu
1 5 10

<210> 98
<211> 13
<212> PRT
<213> Methanopyrus kandleri

<400> 98

Leu Gly Leu Gly Asp Ala Lys Ile Ala Arg Ile Leu Gly
1 5 10

<210> 99
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 99

Leu Arg Ser Leu Val Asn Lys Arg Leu Asp Val Asp Thr Ala Tyr Glu
1 5 10 15

Leu Lys Arg Arg Tyr Gly Ser Val Ser Ala Val
20 25

<210> 100
<211> 10
<212> PRT
<213> Methanopyrus kandleri

<400> 100

Arg Lys Ala Pro Val Lys Glu Leu Arg Glu
1 5 10

<210> 101
<211> 15
<212> PRT
<213> Methanopyrus kandleri

<400> 101

Leu Gly Leu Ser Asp Arg Lys Ile Ala Arg Ile Lys Gly Ile Pro
1 5 10 15

<210> 102
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 102

Glu Thr Met Leu Gln Val Arg Gly Met Ser Val Glu Lys Ala Glu Arg
1 5 10 15

Leu Leu Glu Arg Phe Asp Thr Trp Thr Lys Val
20 25

<210> 103
<211> 9
<212> PRT
<213> Methanopyrus kandleri

<400> 103

Lys Glu Ala Pro Val Ser Glu Leu Val
1 5

<210> 104
<211> 16
<212> PRT
<213> Methanopyrus kandleri

<400> 104

Val Pro Gly Val Gly Leu Ser Leu Val Lys Glu Ile Lys Ala Gln Val
1 5 10 15

<210> 105
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 105

Lys Ala Leu Leu Asp Val Lys Gly Val Ser Pro Glu Leu Ala Asp Arg
1 5 10 15

Leu Val Glu Glu Leu Gly Ser Pro Tyr Arg Val
20 25

<210> 106
<211> 9
<212> PRT
<213> Methanopyrus kandleri

<400> 106

Leu Thr Ala Lys Lys Ser Asp Leu Met
1 5

<210> 107
<211> 16
<212> PRT
<213> Methanopyrus kandleri

<400> 107

Val Glu Arg Val Gly Pro Lys Leu Ala Glu Arg Ile Arg Ala Ala Gly
1 5 10 15

<210> 108

<211> 27
 <212> PRT
 <213> Escherichia coli

<400> 108

Lys Glu Leu Ile Lys Thr Asn Gly Val Gly Pro Lys Leu Ala Leu Ala
 1 5 10 15

Ile Leu Ser Gly Met Ser Ala Gln Gln Phe Val
 20 25

<210> 109
 <211> 26
 <212> PRT
 <213> Escherichia coli

<400> 109

Asn Ala Val Glu Arg Glu Glu Val Gly Ala Leu Pro Gly Ile Gly Lys
 1 5 10 15

Lys Thr Ala Glu Arg Leu Ile Val Glu Met
 20 25

<210> 110
 <211> 57
 <212> PRT
 <213> Homo sapiens

<400> 110

Ala Glu Ala Lys Lys Leu Pro Gly Val Gly Thr Lys Ile Ala Glu Lys
 1 5 10 15

Ile Asp Glu Phe Leu Ala Thr Gly Lys Leu Arg Lys Leu Glu Lys Ile
 20 25 30

Arg Gln Asp Asp Thr Ser Ser Ser Ile Val Ser Gly Ile Gly Pro Ser
 35 40 45

Ala Ala Arg Lys Phe Val Asp Glu Gly
 50 55

<210> 111
 <211> 27
 <212> PRT
 <213> Escherichia coli

<400> 111

Leu Glu Val Met Glu Val Pro Gly Val Gly Pro Lys Thr Ala Arg Gly
 1 5 10 15

Leu Tyr Glu Ala Leu Gly Ile Asp Ser Leu Glu
 20 25

<210> 112
 <211> 12
 <212> PRT
 <213> Escherichia coli

<400> 112

Lys Leu Lys Glu Ala Leu Glu Arg Gly Asp Leu Leu
 1 5 10

<210> 113
 <211> 16
 <212> PRT
 <213> Escherichia coli

<400> 113

Leu Lys Gly Phe Gly Ala Lys Lys Ala Glu Arg Ile Lys Glu Gly Leu
 1 5 10 15

<210> 114
 <211> 30
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 114
 agagcttgag gagagcagga aaggtggaac 30

<210> 115
 <211> 24
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 115
 tgcagagcga ttattcagga atgc 24

<210> 116
 <211> 30
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 116
 acaagggcta ctggttgccg atttttattg 30

<210> 117
 <211> 27
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 117
 gggactggcc tcagaggaaa cttcagg 27

<210> 118
 <211> 30
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 118
 acaagggcta ctggttgccg attttttattg 30

<210> 119
 <211> 28
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 119
 cctgcatttg tggggtgaat tccttgcc 28

<210> 120
 <211> 189
 <212> DNA
 <213> artificial sequence

<220>
 <223> Synthetic Sso7d gene

<220>
 <221> CDS
 <222> (1)..(189)
 <223>

<400> 120
 gca acc gta aag ttc aag tac aaa ggc gaa gaa aaa gag gta gac atc 48
 Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile
 1 5 10 15

tcc aag atc aag aaa gta tgg cgt gtg ggc aag atg atc tcc ttc acc 96
 Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr
 20 25 30

tac gac gag ggc ggt ggc aag acc ggc cgt ggt gcg gta agc gaa aag 144
 Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
 35 40 45

gac gcg ccg aag gag ctg ctg cag atg ctg gag aag cag aaa aag 189
 Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys

50 55 60

<210> 121
 <211> 63
 <212> PRT
 <213> artificial sequence

<220>
 <223> Synthetic Sso7d gene

<400> 121

Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile
 1 5 10 15

Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr
 20 25 30

Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
 35 40 45

Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
 50 55 60

<210> 122
 <211> 1899
 <212> DNA
 <213> artificial sequence

<220>
 <223> The DNA sequence encoding the Sso7d-ATaq fusion protein

<220>
 <221> CDS
 <222> (1)..(1899)
 <223>

<400> 122

atg att acg aat tcg agc gca acc gta aag ttc aag tac aaa ggc gaa 48
 Met Ile Thr Asn Ser Ser Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu
 1 5 10 15

gaa aaa gag gta gac atc tcc aag atc aag aaa gta tgg cgt gtg ggc 96
 Glu Lys Glu Val Asp Ile Ser Lys Ile Lys Lys Val Trp Arg Val Gly
 20 25 30

aag atg atc tcc ttc acc tac gac gag ggc ggt ggc aag acc ggc cgt 144
 Lys Met Ile Ser Phe Thr Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg
 35 40 45

ggt gcg gta agc gaa aag gac gcg ccg aag gag ctg ctg cag atg ctg 192
 Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu Leu Leu Gln Met Leu
 50 55 60

gag aag cag aaa aag ggc ggc ggt gtc act agt ccc aag gcc ctg gag 240
 Glu Lys Gln Lys Lys Gly Gly Gly Val Thr Ser Pro Lys Ala Leu Glu
 65 70 75 80

gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc ttt gtg ctt Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu 85 90 95	288
tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg gcc gcc gcc Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Ala 100 105 110	336
agg ggg ggc cgg gtc cac ccg gcc ccc gag cct tat aaa gcc ctc agg Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg 115 120 125	384
gac ctg aag gag gcg ccg ggg ctt ctc gcc aaa gac ctg agc gtt ctg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu 130 135 140	432
gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac ccc atg ctc Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu 145 150 155 160	480
ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag ggg gtg gcc Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly Val Ala 165 170 175	528
cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag cgg gcc gcc Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg Ala Ala 180 185 190	576
ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt gag ggg gag Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu Gly Glu 195 200 205	624
gag agg ctc ctt tgg ctt tac ccg gag gtg gag agg ccc ctt tcc gct Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala 210 215 220	672
gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac gtg gcc tat Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr 225 230 235 240	720
ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc cgc ctc gag Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu 245 250 255	768
gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc aac tcc cgg Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg 260 265 270	816
gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt ccc gcc atc Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile 275 280 285	864
ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc gcc gtc ctg Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu 290 295 300	912

gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc ctg cag tac	960
Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr	
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cgg gag ctc acc aag ctg aag agc acc tac att gac ccc ttg ccg gac	1008
Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp	
325 330 335	
ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc aac cag acg	1056
Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr	
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gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac ctc cag aac	1104
Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn	
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atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg gcc ttc atc	1152
Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile	
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gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc cag ata gag	1200
Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu	
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ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg atc cgg gtc	1248
Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val	
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Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp Met Phe	
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Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala Ala Lys	
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Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser	
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Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile Glu Arg	
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Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu	
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cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg cgg gag gcg	1584
Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg Glu Ala	
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Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val Gly Ile	
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Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu Leu Leu Gln Met Leu	
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Glu Lys Gln Lys Lys Gly Gly Gly Val Thr Ser Pro Lys Ala Leu Glu	
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Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu	
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Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Ala	
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Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg
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 Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu
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 Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu
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 Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg Ala Ala
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 Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala
 210 215 220
 Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr
 225 230 235 240
 Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu
 245 250 255
 Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg
 260 265 270
 Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile
 275 280 285
 Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu
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 Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr
 305 310 315 320
 Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp
 325 330 335
 Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr
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 Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn
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 Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile
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 Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu
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435								440				445			
Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser
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Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile	Glu	Arg
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Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Glu	Glu	Met
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Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu	Glu	Ala
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Pro	Lys	Glu	Arg	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu	Val	Met
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Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Ile
595								600				605			
Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Gly	Ile	Asp	Gly	Arg	Gly	Gly
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Glu Lys Glu Val Asp Ile Ser Lys Ile Lys Lys Val Trp Arg Val Gly	
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aag atg atc tcc ttc acc tac gac gag ggc ggt ggc aag acc ggc cgt	144
Lys Met Ile Ser Phe Thr Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg	
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ggt gcg gta agc gaa aag gac gcg ccg aag gag ctg ctg cag atg ctg	192
Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu Leu Leu Gln Met Leu	
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gag aag cag aaa aag ggc ggc ggt gtc act agt ggg atg ctg ccc ctc	240
Glu Lys Gln Lys Lys Gly Gly Gly Val Thr Ser Gly Met Leu Pro Leu	
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ttt gag ccc aag ggc cgg gtc ctc ctg gtg gac ggc cac cac ctg gcc	288
Phe Glu Pro Lys Gly Arg Val Leu Leu Val Asp Gly His His Leu Ala	
85 90 95	
tac cgc acc ttc cac gcc ctg aag ggc ctc acc acc agc cgg ggg gag	336
Tyr Arg Thr Phe His Ala Leu Lys Gly Leu Thr Thr Ser Arg Gly Glu	
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Pro Val Gln Ala Val Tyr Gly Phe Ala Lys Ser Leu Leu Lys Ala Leu	
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Lys Glu Asp Gly Asp Ala Val Ile Val Val Phe Asp Ala Lys Ala Pro	
130 135 140	
tcc ttc cgc cac gag gcc tac ggg ggg tac aag gcg ggc cgg gcc ccc	480
Ser Phe Arg His Glu Ala Tyr Gly Gly Tyr Lys Ala Gly Arg Ala Pro	
145 150 155 160	
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Thr Pro Glu Asp Phe Pro Arg Gln Leu Ala Leu Ile Lys Glu Leu Val	
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Asp Leu Leu Gly Leu Ala Arg Leu Glu Val Pro Gly Tyr Glu Ala Asp	
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Asp Val Leu Ala Ser Leu Ala Lys Lys Ala Glu Lys Glu Gly Tyr Glu	
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210 215 220	

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gcc ctg acc ggg gac gag tcc gac aac ctt ccc ggg gtc aag ggc atc Ala Leu Thr Gly Asp Glu Ser Asp Asn Leu Pro Gly Val Lys Gly Ile 260 265 270	816
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gtg cgc acc gac ctg ccc ctg gag gtg gac ttc gcc aaa agg cgg gag Val Arg Thr Asp Leu Pro Leu Glu Val Asp Phe Ala Lys Arg Arg Glu 325 330 335	1008
ccc gac cgg gag agg ctt agg gcc ttt ctg gag agg ctt gag ttt ggc Pro Asp Arg Glu Arg Leu Arg Ala Phe Leu Glu Arg Leu Glu Phe Gly 340 345 350	1056
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Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu	Gly	Glu		
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gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	gag	agg	ccc	ctt	tcc	gct	1536	
Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	Leu	Ser	Ala		
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Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	Val	Ala	Tyr		
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ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	gag	atc	gcc	cgc	ctc	gag	1632	
Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	Glu	Ile	Ala	Arg	Leu	Glu		
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ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	acc	agc	gcc	gcc	gtc	ctg	1776	
Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu		
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Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	Tyr		
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Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	Leu	Pro	Asp		
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gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc ggc cgc cgc Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg 785 790 795 800			2400
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ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg gag gaa atg Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu Glu Met 835 840 845			2544
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cca aaa gag agg gcg gag gcc gtg gcc cgg ctg gcc aag gag gtc atg Pro Lys Glu Arg Ala Glu Ala Val Ala Arg Leu Ala Lys Glu Val Met 865 870 875 880			2640
gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gtg gag gtg ggg ata Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val Gly Ile 885 890 895			2688
ggg gag gac tgg ctc tcc gcc aag gag ggc att gat ggc cgc ggc gga Gly Glu Asp Trp Leu Ser Ala Lys Glu Gly Ile Asp Gly Arg Gly Gly 900 905 910			2736

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2763

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Lys	Met	Ile	Ser	Phe	Thr	Tyr	Asp	Glu	Gly	Gly	Gly	Lys	Thr	Gly	Arg	35	40	45	
Gly	Ala	Val	Ser	Glu	Lys	Asp	Ala	Pro	Lys	Glu	Leu	Leu	Gln	Met	Leu	50	55	60	
Glu	Lys	Gln	Lys	Lys	Gly	Gly	Gly	Val	Thr	Ser	Gly	Met	Leu	Pro	Leu	65	70	75	80
Phe	Glu	Pro	Lys	Gly	Arg	Val	Leu	Leu	Val	Asp	Gly	His	His	Leu	Ala	85	90	95	
Tyr	Arg	Thr	Phe	His	Ala	Leu	Lys	Gly	Leu	Thr	Thr	Ser	Arg	Gly	Glu	100	105	110	
Pro	Val	Gln	Ala	Val	Tyr	Gly	Phe	Ala	Lys	Ser	Leu	Leu	Lys	Ala	Leu	115	120	125	
Lys	Glu	Asp	Gly	Asp	Ala	Val	Ile	Val	Val	Phe	Asp	Ala	Lys	Ala	Pro	130	135	140	
Ser	Phe	Arg	His	Glu	Ala	Tyr	Gly	Gly	Tyr	Lys	Ala	Gly	Arg	Ala	Pro	145	150	155	160
Thr	Pro	Glu	Asp	Phe	Pro	Arg	Gln	Leu	Ala	Leu	Ile	Lys	Glu	Leu	Val	165	170	175	
Asp	Leu	Leu	Gly	Leu	Ala	Arg	Leu	Glu	Val	Pro	Gly	Tyr	Glu	Ala	Asp	180	185	190	
Asp	Val	Leu	Ala	Ser	Leu	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu	195	200	205	
Val	Arg	Ile	Leu	Thr	Ala	Asp	Lys	Asp	Leu	Tyr	Gln	Leu	Leu	Ser	Asp	210	215	220	

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 260 265 270
 Gly Glu Lys Thr Ala Arg Lys Leu Leu Glu Glu Trp Gly Ser Leu Glu
 275 280 285
 Ala Leu Leu Lys Asn Leu Asp Arg Leu Lys Pro Ala Ile Arg Glu Lys
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 Ile Leu Ala His Met Asp Asp Leu Lys Leu Ser Trp Asp Leu Ala Lys
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 405 410 415
 Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu
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 Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu
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 485 490 495
 Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala
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 515 520 525

Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu
 530 535 540

Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg
 545 550 555 560

Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile
 565 570 575

Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu
 580 585 590

Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr
 595 600 605

Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp
 610 615 620

Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr
 625 630 635 640

Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn
 645 650 655

Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile
 660 665 670

Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu
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Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val
 690 695 700

Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp Met Phe
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Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala Ala Lys
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Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser
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Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile Glu Arg
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Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu
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Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg
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Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg Glu Ala
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Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala Ala Asp
 820 825 830

Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu Glu Met
835 840 845

Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu Glu Ala
850 855 860

Pro Lys Glu Arg Ala Glu Ala Val Ala Arg Leu Ala Lys Glu Val Met
865 870 875 880

Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val Gly Ile
885 890 895

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Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30
act ttt aga cca tac att tac gct ctt ctc agg gat gat tca aag att 144
Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45
gaa gaa gtt aag aaa ata acg ggg gaa agg cat gga aag att gtg aga 192
Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
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att gtt gat gta gag aag gtt gag aaa aag ttt ctc ggc aag cct att 240
Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80
acc gtg tgg aaa ctt tat ttg gaa cat ccc caa gat gtt ccc act att 288
Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
85 90 95
aga gaa aaa gtt aga gaa cat cca gca gtt gtg gac atc ttc gaa tac 336

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Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro		
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Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Ile	Leu	Ala	Phe	Asp	Ile	Glu	Thr		
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Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys		
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Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr		
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Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser			
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gga gtt aaa ata aag cca gga atg gta att gga tac ata gta ctt aga Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val Leu Arg 675 680 685	2064
ggc gat ggt cca att agc aat agg gca att cta gct gag gaa tac gat Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu Tyr Asp 690 695 700	2112
ccc aaa aag cac aag tat gac gca gaa tat tac att gag aac cag gtt Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln Val 705 710 715 720	2160
ctt cca gcg gta ctt agg ata ttg gag gga ttt gga tac aga aag gaa Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg Lys Glu 725 730 735	2208
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aag tac aaa ggc gaa gaa aaa gag gta gac atc tcc aag atc aag aaa Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile Ser Lys Ile Lys Lys 770 775 780	2352

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 785 790 795 800

ggc aag acc ggc cgt ggt gcg gta agc gaa aag gac gcg ccg aag gag 2448
 Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu
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ctg ctg cag atg ctg gag aag cag aaa aag tga 2481
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 820 825

<210> 127
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<220>
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 35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
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Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
 85 90 95

Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125

Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
 130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
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Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
 165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys

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Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu		
275						280						285					
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn		
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Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu		
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Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu		
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Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala		
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Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser		
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Tyr	Thr	Gly	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn		
385						390						395					
Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr		
405						410						415					
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435						440						445					
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile		
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465						470						475					
Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser	Val		

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Val	Leu	Glu	Thr	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	Val	Arg
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Asp	Leu	Arg	Tyr	Gln	Lys	Thr	Arg	Gln	Val	Gly	Leu	Thr	Ser	Trp	Leu
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Asn	Ile	Lys	Lys	Ser	Gly	Thr	Gly	Gly	Gly	Gly	Ala	Thr	Val	Lys	Phe
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Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr Tyr Asp Glu Gly Gly
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Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu
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Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
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<210> 128

<211> 1905

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<400> 128

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caccccagga cgggcccgcct ccacaccgc ttcaaccaga cggccacggc cacgggcagg	1080
ctaagtagct ccgatcccaa cctccagaac atccccgtcc gcaccccgct tgggcagagg	1140
atccgccggg ccttcacgac cgaggagggg tggtatttgg tggccctgga ctatagccag	1200

atagagctca ggggtgctggc ccacctctcc ggcgacgaga acctgatccg ggtcttccag 1260
 gaggggcggg acatccacac ggagaccgcc agctggatgt tcggcgctccc ccgggaggcc 1320
 gtggaccccc tgatgcgccg ggcggccaag accatcaact tcggggtcct ctacggcatg 1380
 tcggcccacc gcctctccca ggagctagcc atcccttacg aggaggccca ggccttcatt 1440
 gagcgctact ttcagagctt cccaaggtg cgggcctgga ttgagaagac cctggaggag 1500
 ggcaggaggc gggggtagct ggagaccctc ttcggccgcc gccgctacgt gccagaccta 1560
 gagggccggg tgaagagcgt gcgggaggcg gccgagcgca tggccttcaa catgcccgtc 1620
 cagggcaccg ccgccgacct catgaagctg gctatggtga agctcttccc caggctggag 1680
 gaaatggggg ccaggatgct ccttcaggct cacgacgagc tggtcctcga ggccccaaaa 1740
 gagagggcgg aggccgtggc ccggctggcc aaggaggtca tggagggggg gtatcccctg 1800
 gccgtgcccc tggaggtgga ggtggggata ggggaggact ggctctccgc caaggagggc 1860
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<210> 129

<211> 634

<212> PRT

<213> artificial sequence

<220>

<223> The amino acid sequence of the Sac7d-ATAq fusion protein

<400> 129

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1				5					10					15	
Glu	Lys	Glu	Val	Asp	Thr	Ser	Lys	Ile	Lys	Lys	Val	Trp	Arg	Val	Gly
			20					25				30			
Lys	Met	Val	Ser	Phe	Thr	Tyr	Asp	Asp	Asn	Gly	Lys	Thr	Gly	Arg	Gly
		35					40					45			
Ala	Val	Ser	Glu	Lys	Asp	Ala	Pro	Lys	Glu	Leu	Leu	Asp	Met	Leu	Ala
	50					55					60				
Arg	Ala	Glu	Arg	Glu	Lys	Lys	Gly	Gly	Gly	Val	Thr	Ser	Pro	Lys	Ala
65					70					75				80	
Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe
			85						90					95	
Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	Leu	Ala	Leu	Ala
			100					105					110		
Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	Pro	Tyr	Lys	Ala

115					120					125						
Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ser	
130					135					140						
Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	Gly	Asp	Asp	Pro	
145					150					155					160	
Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	
165					170					175						
Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	Arg	
180					185					190						
Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu	
195					200					205						
Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	Leu	
210					215					220						
Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	Val	
225					230					235					240	
Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	Glu	Ile	Ala	Arg	
245					250					255						
Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	
260					265					270						
Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	Leu	Gly	Leu	Pro	
275					280					285						
Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	
290					295					300						
Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	
305					310					315					320	
Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	Leu	
325					330					335						
Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	
340					345					350						
Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	
355					360					365						
Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	
370					375					380						
Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	
385					390					395					400	
Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	
405					410					415						
Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	Trp	

420					425					430					
Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala
		435					440					445			
Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg
	450					455					460				
Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile
465					470					475					480
Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys
				485					490					495	
Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly
			500					505					510		
Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	Arg
		515					520					525			
Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala
	530					535					540				
Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Glu
545					550					555					560
Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu
				565				570					575		
Glu	Ala	Pro	Lys	Glu	Arg	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu
			580				585					590			
Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val
		595					600					605			
Gly	Ile	Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Gly	Ile	Asp	Gly	Arg
	610					615					620				
Gly	Gly	Gly	Gly	His	His	His	His	His	His						
625				630											

<210> 130

<211> 1965

<212> DNA

<213> artificial sequence

<220>

<223> The DNA sequence encoding the PL-delta Taq fusion protein

<400> 130

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aaaggcggcg gtgtcactag tggcgcaacc gtaaagttca agtacaaagg cgaagaaaaa 120

gaggtagaca tctccaagat caagaaagta tggcgtgtgg gcaagatgat ctccttcacc 180

tacgacgagg gcggtggcaa gaccggccgt ggtgcggtaa gcgaaaagga cgcgccgaag 240

gagctgctgc agatgctgga gaagcagaaa aagggcgggcg gtgtcaccag tcccaaggcc	300
ctggaggagg ccccttgcc cccgccgaa ggggccttcg tgggctttgt gctttccgc	360
aaggagccca tgtgggccga tcttctggcc ctggccgccg ccagggggg ccgggtccac	420
cgggccccc agccttataa agccctcagg gacctgaagg aggcgcgggg gcttctcgcc	480
aaagacctga gcgttctggc cctgaggga ggccttgcc tcccgcccg cgacgacccc	540
atgctcctcg cctacctcct ggacccttc aacaccacc ccgagggggg gggccggcg	600
tacggcgggg agtggacgga ggaggcgggg gagcgggccg ccctttccga gaggtcttc	660
gccaacctgt gggggaggct tgagggggag gagaggctcc tttggcttta ccgggaggtg	720
gagaggcccc tttccgctgt cctggccac atggaggcca cgggggtgcg cctggacgtg	780
gcctatctca gggccttgtc cctggagggt gccgaggaga tcggccgcct cgaggccgag	840
gtcttccgc tggccggcca ccccttcaac ctcaactccc gggaccagct ggaaagggtc	900
ctctttgacg agctagggct tcccgccatc ggcaagacgg agaagaccgg caagcgctcc	960
accagcgcg ccgtcctgga ggccctccgc gagggccacc ccatcgtgga gaagatcctg	1020
cagtaccggg agctaccaa gctgaagagc acctacattg accccttgcc ggacctcatc	1080
caccccagga cggccgcct ccacaccgc ttcaaccaga cggccacggc cacgggcagg	1140
ctaagtagct ccgatccaa cctccagaac atccccgtcc gcaccccgct tgggcagagg	1200
atccgcggg ccttcatcg cgaggagggg tggctattgg tggccctgga ctatagccag	1260
atagagctca gggtgctggc ccacctctcc ggcgacgaga acctgatccg ggtcttccag	1320
gaggggcggg acatccacac ggagaccgcc agctggatgt tcggcgctcc ccgggaggcc	1380
gtggaccccc tgatgcgcc ggcgccaag accatcaact tcggggctct ctacggcatg	1440
tcggccacc gcctctcca ggagctagc atcccttacg aggaggcca ggccttcatt	1500
gagcgctact ttcagagctt cccaagggtg cgggcctgga ttgagaagac cctggaggag	1560
ggcaggaggc ggggttacgt ggagaccctc ttcggccgcc gccgctacgt gccagacct	1620
gagggccggg tgaagagcgt gcgggaggcg gccgagcgca tggccttcaa catgcccgtc	1680
cagggcaccg ccgccacct catgaagctg gctatggtga agctcttccc caggctggag	1740
gaaatggggg ccaggatgct ccttcaggtc cagcagagc tggctctcga ggccccaaaa	1800
gagagggcgg aggccgtggc ccggctggcc aaggaggtca tggagggggg gtatcccctg	1860
gccgtgcccc tggagggtga ggtggggata ggggaggact ggctctccgc caaggagggc	1920

attgatggcc gcggcggagg cgggcatcat catcatcatc attaa

1965

<210> 131

<211> 654

<212> PRT

<213> artificial sequence

<220>

<223> The amino acid sequence of PL- delta Taq fusion protein

<400> 131

Met	Ile	Thr	Asn	Ser	Lys	Lys	Lys	Lys	Lys	Lys	Lys	Arg	Lys	Lys	Arg	
1				5					10					15		
Lys	Lys	Lys	Lys	Lys	Gly	Gly	Gly	Val	Thr	Ser	Gly	Ala	Thr	Val	Lys	
			20				25						30			
Phe	Lys	Tyr	Lys	Gly	Glu	Glu	Lys	Glu	Val	Asp	Ile	Ser	Lys	Ile	Lys	
		35					40					45				
Lys	Val	Trp	Arg	Val	Gly	Lys	Met	Ile	Ser	Phe	Thr	Tyr	Asp	Glu	Gly	
	50					55					60					
Gly	Gly	Lys	Thr	Gly	Arg	Gly	Ala	Val	Ser	Glu	Lys	Asp	Ala	Pro	Lys	
65					70					75					80	
Glu	Leu	Leu	Gln	Met	Leu	Glu	Lys	Gln	Lys	Lys	Gly	Gly	Gly	Val	Thr	
				85					90					95		
Ser	Pro	Lys	Ala	Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala	
			100					105					110			
Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	
		115					120						125			
Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	
	130					135					140					
Pro	Tyr	Lys	Ala	Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	
145					150					155					160	
Lys	Asp	Leu	Ser	Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	
				165					170					175		
Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	
			180					185					190			
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	
		195				200						205				
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	
	210					215					220					
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	
225					230					235					240	

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val
 245 250 255
 Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu
 260 265 270
 Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro
 275 280 285
 Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu
 290 295 300
 Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser
 305 310 315 320
 Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val
 325 330 335
 Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr
 340 345 350
 Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His
 355 360 365
 Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser
 370 375 380
 Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg
 385 390 395 400
 Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu
 405 410 415
 Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp
 420 425 430
 Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu
 435 440 445
 Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu
 450 455 460
 Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met
 465 470 475 480
 Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala
 485 490 495
 Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala
 500 505 510
 Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu
 515 520 525
 Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val
 530 535 540

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val
 545 550 555 560
 Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe
 565 570 575
 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp
 580 585 590
 Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala Arg
 595 600 605
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu
 610 615 620
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Gly
 625 630 635 640
 Ile Asp Gly Arg Gly Gly Gly Gly His His His His His His
 645 650

<210> 132
 <211> 20
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 132
 cctgctctgc cgcttcacgc

20

<210> 133
 <211> 20
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 133
 gcacagcggc tggctgagga

20

<210> 134
 <211> 22
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 134
 tgacggagga taacgccagc ag

22

<210> 135
 <211> 25
 <212> DNA

<213> artificial sequence
 <220>
 <223> primer
 <400> 135
 gaaagacgat gggtcgctaa tacgc 25
 <210> 136
 <211> 22
 <212> DNA
 <213> artificial sequence
 <220>
 <223> primer
 <400> 136
 tgacggagga taacgccagc ag 22
 <210> 137
 <211> 22
 <212> DNA
 <213> artificial sequence
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 <223> primer
 <400> 137
 ggggttgag gtcaatgggt tc 22
 <210> 138
 <211> 20
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 <223> primer
 <400> 138
 cctgctctgc cgcttcacgc 20
 <210> 139
 <211> 22
 <212> DNA
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 <400> 139
 cacatgggtac agcaagcctg gc 22
 <210> 140
 <211> 23
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 140
 cccgtatctg ctgggatact ggc 23

<210> 141
 <211> 23
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 141
 cagcgggtgct gactgaatca tgg 23

<210> 142
 <211> 19
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 142
 cctgcctgcc gcttcacgc 19

<210> 143
 <211> 22
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 143
 ccaatacccg ttctcatcgcg gc 22

<210> 144
 <211> 19
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 144
 ccacctcatc ctgggcacc 19

<210> 145
 <211> 22
 <212> DNA
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<220>
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<400> 145	
gcttgaggcc aaccatcaga gc	22
<210> 146	
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ggttggccaa tctactccca gg	22
<210> 147	
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<220>	
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<400> 147	
gctcactcag tgtggcaaag	20
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<211> 24	
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<223> primer	
<400> 148	
gattagcaaaa agggcctagc ttgg	24